U. S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT

USACE CONTRACT No. W912P8-07-D-0047 DELIVERY ORDER 0002

Westbank and Vicinity, New Orleans, Louisiana
Hurricane Protection Project
West of Algiers
Belle Chase Highway to Hero Cutoff Levee Enlargement
Floodwalls and Floodgates
STA. 980+00 to STA. 1230+00
WBV 6a.2 Algiers Canal Industrial Reach, Phase 2
Hurricane Protection for 1% Storm
Engineering Alternative Report

Plaquemines Parish, Louisiana

Design Alternative Study Report
100% Submittal

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EXECUTIVE SUMMARY

This report provides analyses of several alternative plans to increase the level of hurricane flood protection in the westbank area of New Orleans along the west side of the Algiers Canal south of Belle Chase Highway. The alternatives that were evaluated consisted of variations of earthen levees with floodgates, and various alignments of floodwalls with floodgates. The main objective of this study is to assess the viability of a range of alternatives to the 2057 minimum hydraulic levee elevation of 14.0. One alternative addresses flood protection to the Phase 1 Pre-Katrina authorized elevation of 10.0, with the assumption that this alternative will be part of a larger program to provide 100-year protection for the area. All elevations were provided by the United States Army Corp of Engineers (USACE) at the onset of this study. The alternatives are described in detail in Section 4, and are briefly identified in **Table E1**.

Table E1
Project Alternatives

Alternative	Protection along West Bank of Algiers Canal	Protection Description
1	100-year	Levee enlargement with geotextile reinforcements. Ramps and gates as required.
2	100-year	Levee enlargement with soil-mixing. Ramps and gates as required.
3	100-year	Standard levee enlargement with gates and ramps as required.
4	100-year	Floodwall along Engineers Rd. with gates at each property.
5	100-year	Floodwall along Engineers Road. Limited access gates and a parallel road flood side of the floodwall.
6	100-year	Floodwall along the landside toe of existing levee with gates and ramps as required.
7	Phase 1 Pre-Katrina Authorized	Earthen levee or geotextile-reinforced levee to Phase 1 pre-Katrina authorized elevation with gates.

The development of each alternative consisted of developing alignments and site layouts, performing preliminary design calculations, and developing initial cost estimates and quantities. The alignments and layouts were used to identify new real estate requirements and any required major relocations. Expected construction durations were also provided for each alternative.

Certain results of the study are summarized in **Table E2**. There is a substantial difference in estimated costs among the alternatives, with total costs ranging from $40M to over $342M.

Table E2
Alternative Comparison Matrix

Alt.	Cost	Time for Construction Completion (assumes 5 contracts over reach)		Additional Perpetual Flood Protection Easement (acres)
		Phase 1 Pre-Katrina Authorized	100-year	
1	Initial $ 105.2M Req'd Lifts $12.2M*	N/A	2 years (1 crew per contract)	17.5
2	Initial $ 173.6M Req'd Lift $6.1M**	N/A	2.8 years (1 crew per contract)	17.5
3	Initial $ 144.8M Req'd Lifts $31.4M***	N/A	2.8 years (2 crews per contract for earthwork)	156.6
4	$ 341.7M	N/A	2.8 years (1 crew per contract)	38.7
5	$ 334.1M	N/A	2.5 years (1 crew per contract)	56.7
6	$ 280.9M	N/A	2.8 years (1 crew per contract)	0
7	$ 39.9M	1.3 years (1 crew per contract)	N/A	0

*It is estimated that Alternative 1 will require two additional lifts due to settlement within the first year after the initial raising of the levee. Each lift will cost $6.1M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

** It is estimated that Alternative 2 will require one additional lift due to settlement within two years of the initial raising of the levee. This lift will cost $6.1M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

*** It is estimated that Alternative 3 will require two additional lifts due to settlement within 2.5 years of the initial raising of the levee. Each lift will cost $15.7M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

Permanent additional real estate right-of-way will have to be acquired for all alternatives but Alternatives 6 and 7. Temporary work area easements for potential floodwalls, access roads, gates, ramps, or enlarged levees will also have to be obtained for all alternatives except Alternative 7. Please refer to Section 6 and Appendix F for more details.

It should be noted that all alternatives will affect property owners and their operations to some degree during construction. Several will have lasting implications to the owners due to the design requirements. Those effects are discussed below.

- Alternatives 1 and 2 both have similar footprints and effects on property owners. Although the number of buildings to be relocated is relatively low when compared to Alternative 3, Alternatives 1 and 2 reduce the amount of work space that the owners currently have in production yards. Many owners currently perform work activities within the USACE's right-of-way. Due to the necessary acquisition of additional right-of-way for the levee and the large areas needed to construct the higher access ramps, many owners lose valuable space to perform work activities. This may impact their ability to sustain their businesses at their respective locations.

- Alternative 3 extends the current levee footprint substantially and will have an effect on every property owner along the canal. This new right-of-way would require the acquisition of more than half of the properties' working area and would require relocation of a significant number of buildings and structures. This alternative would force many businesses to relocate due to limited space to perform operations.

- Alternatives 4 and 5 will have large impacts on the businesses that have offices and work space along Engineers Road. Although levee access is not as limited as previous alternatives discussed, the owners will lose work space, and will also be left out of the protection system (i.e., between the existing levee at 10.0' and the floodwall at Engineers Road at 14.0'). Alternative 5 will require more right-of-way than Alternative 4 due to the internal access road. Many buildings and structures will be affected by both alternatives.

- Of the alternatives that offer 2057 protection, Alternative 6 offers the least long term impact to property owners despite its high cost, but will have a large impact on owners during construction due to the design requirements. Each property will require floodwall along the existing levee and a gate be constructed for canal access. In addition, the cost of Alternative 6 could be as much as $50M more than shown in Table E2 due to additional pile length required due to drag loads.

- Alternative 7 only impacts those business owners who have justified a need for a gate for levee access. The remainder of properties who need levee access will already have a ramp constructed during the current levee lift to 10.0'.

After consideration of each of the alternatives presented in this report, several of the alternatives were determined to be much less feasible due to high costs, long construction durations, utility and building relocations, or large amounts of required additional right-of-way. After evaluation of these criteria, Alternatives 1 and 7 are the most feasible options; however, both alternatives have their disadvantages. It should be noted that Alternative 1 will have soil settlement that will require maintenance lifts after construction, and Alternative 7 does not provide 2057 level of protection. For Alternative 7, it is assumed that the 2057 level of protection would have to be established south of this project reach.

Alternative 1 is the preferred alternative assuming 2057 protection is not implemented south of the project reach. It is the lowest cost option that provides 2057 flood protection. However,

should the 2057 protection be provided south of the project reach, Alternative 7 becomes the preferred alternative. Alternative 7 has the least impact to the current property owners at a lower cost when compared to all alternatives except Alternative 1.

Alternatives 4, 5, and 6 are much higher cost, and Alternative 3 has significantly longer construction duration than the other alternatives. These alternatives are less feasible for these reasons. Alternatives 1 and 2 have many similarities concerning required right-of-way, alignment, and design; however, Alternative 2 is more expensive and has longer construction duration in comparison to Alternative 1. For this reason, Alternative 2 is not a less viable option. Of the seven alternatives, Alternatives 1 and 7 are the most feasible with regards to cost and construction schedule; however, it should be noted that Alternative 7 only provides protection to the Phase 1 Pre-Katrina authorized level.

SECTION 1 - INTRODUCTION

This report presents the results of the feasibility-level engineering investigation of seven alternatives for providing the 100-year level of flood protection on the west side of the Algiers Canal, Plaquemines Parish, Southeast Louisiana, from Belle Chasse Highway (LA Hwy 23) to the Hero Cutoff for 25,000 linear feet of levee (Station 980+00 to Station 1230+00). The report contains the preliminary engineering and cost estimates and presents conclusions and recommendations for more detailed investigation. The main body of the report includes information about the project vicinity and site; a summary of the engineering criteria and methodologies employed; a discussion of each alternative investigated, including a summary of required right-of-way (ROW) and utility relocations; and cost estimate summaries. Feasibility-level analyses, designs, quantity take-offs and supporting information for the cost estimates are presented in the appendices. All the elevations in this report are referenced to North American Vertical Datum 1988 (2004.65)

The Algiers Canal is part of the Gulf Intracoastal Waterway (GIWW) and is located in the Westbank of the Metropolitan New Orleans Area. It is lined on both sides by a levee system whose crown generally varies between approximately Elevation 8 – 9.5 feet NAVD88, except in the immediate vicinity of the tunnel, where the flood protection is lower. Four reaches comprise the Algiers Canal Flood Protection System: Algiers Canal West – Lock to Belle Chasse Highway; Algiers Canal East – Lock to Belle Chasse Highway; Algiers Canal West – Belle Chasse Highway to Hero Cutoff (subject of this report); and Algiers Canal East – Belle Chasse Highway to Hero Cutoff. The levee in the project area discussed in this report was urgently raised to an approximate elevation of 8.0 feet NAVD88 following Hurricanes Katrina and Rita. At the time of this report, the levee was being raised to the Phase 1 pre-Katrina authorized protection of El. 10.0 NAVD88.

The seven evaluated alternatives are as follows:

Table 1-1
Project Alternatives

Alternative	Protection along West Bank of Algiers Canal	Protection Description
1	100-year	Levee enlargement with geotextile reinforcements. Ramps and gates as required.
2	100-year	Levee enlargement with soil-mixing. Ramps and gates as required.
3	100-year	Standard levee enlargement with gates and ramps as required.
4	100-year	Floodwall along Engineers Rd. with gates at each property.
5	100-year	Floodwall along Engineers Road. Limited access gates and a parallel road flood side of the floodwall.
6	100-year	Floodwall along the landside toe of existing levee with gates and ramps as required.
7	Phase 1 Pre-Katrina Authorized	Earthen levee or geotextile-reinforced levee to Phase 1 pre-Katrina authorized elevation with gates.

For this report, the Government furnished the following information:

- Design Memorandum (DM) No. 2, dated January 1999, detailing the protection required for the Standard Project Hurricanes (SPH) along the East and West of the Algiers Canal, East of Harvey Canal, Hurricane Protection Project. The area addressed by the Scope of Work is the industrial reach along the Western side of the Algiers Canal between STA. 980+00 to STA. 1230+00.
- Minimum survey standards.
- USACE regulations – relevant EMs, ERs, ETLs, etc.
- CADD standards.
- Form parts.
- Existing survey data and soil borings.
- Survey baseline information for the project area.

- Hydraulic design data.
- File numbers, project names, and titles.
- Sample cost estimate.

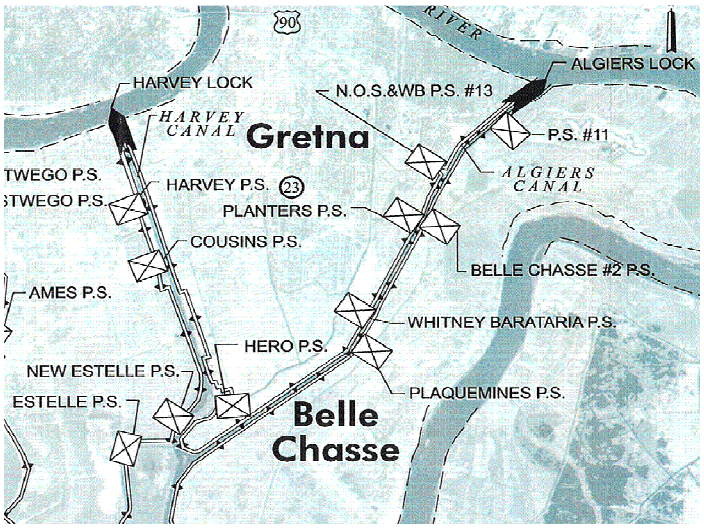
SECTION 2 – PURPOSE AND SCOPE OF STUDY

2.1 Objectives

The USACE has a goal of replacing the existing hurricane protection with new protection designed for 100-year elevations for the Westbank and vicinity area. URS has been tasked by the USACE to explore multiple alternatives to provide this level of flood protection to the area. The study area is illustrated in **Figure 1** and is shown in more detail on Plate 1. This study is to provide a more detailed examination of seven alternatives, including an examination of costs, quantities, completion dates, rights-of-way, relocations, and design studies and calculations. The purpose of this report is to present the results of an analysis of HSDRRS alternatives and to recommend the most feasible alternative based on engineering investigation.

The main objective of this study is to assess the viability of a range of alternatives to the 100-year elevation based upon the considerations addressed herein. Results of this study should provide a basis for recommending one alternative as the basis for providing the desired level of protection. It should be noted that portions of this report will be integrated into a larger report for the Sector Gate South Study. The elevation for top of protection was specified as 14.5 in the original scope of work provided by the USACE, however, subsequent to the notice to proceed the 100-year top of protection elevation was later revised to Elevation 14.0.

Figure 1
Study Area



The contract scope of work describes the basic requirements of the study and describes each of the seven alternatives identified by the USACE. The scope identifies gate sizes and locations, and required levels of protection. It also establishes criteria for floodwalls and earthen levees. In addition, the scope lists documents listing design data and standards, soil borings, and survey data.

2.2 Level of Detail

The analysis and designs performed in this report were developed to prepare preliminary quantity estimates and develop cost estimates for each alternative that is accurate to within 25 % contingency. Established design criteria were used to perform detailed calculations to determine the size and quantity of all major features and major components, and estimate the baseline cost estimate and project schedule for each alternative. These design calculations were also detailed enough to develop real estate requirements and utility relocations. The structural work includes the design of the main structures under consideration, including T-walls, foundations, and sizing of the stems and base slabs. Plates of the project area have been developed to display alignments, profiles, setbacks, and easements. Drawings showing structural details have been prepared for major components common to all the alternatives.

SECTION 3 – DESCRIPTION OF EXISTING PROTECTION

3.1 Type of Protection

The subject reach is currently protected by earthen levee, except in the vicinity of the Whitney Barataria Pump Station. In this location, earthen levee transitions to floodwall that protects the discharge canal from the pump station to the Algiers Canal. Following the 2005 Hurricanes Katrina and Rita, the USACE urgently placed additional fill to bring the levee to an elevation of approximately 8.0 feet NAVD88. Due to the heavy industrial nature of many businesses along this reach, gaps were left at existing ramps for continuation of those business activities. These gaps were to be flood-fought with sand bags should the Algiers Canal stage increase due to a storm event.

The USACE is currently raising this levee to the Phase 1 pre-Katrina authorized elevation of 10.0 feet NAVD88. Although many ramps will be constructed for business activities, there will still be many gaps left where ramps could not be built, either for geometric or levee stability reasons. These gaps are assumed to be locations for future gates, should the protection ultimately remain at Phase 1 pre-Katrina authorized elevations (i.e., should the Sector Gate South project be constructed). In the interim, these gaps will still need to be flood-fought when high canal stages threaten.

3.2 Alignment

The levee alignment generally parallels the water's edge, with distance from levee centerline to water's edge ranging from as close as 35 feet to as much as 110 feet. Refer to the ROW drawings and plates for more specific information. The federal baseline is generally the same as the levee centerline.

The current levee lift (to El. 10.0 NAVD88) shifts the levee toward Engineers Road in a few locations to accommodate business activities. Assuming no field changes to the ongoing construction, those locations are:

Lot 1 – Hero Land Co. (leased to Double Aught Construction)
Lot 12 – Point Eight Power
Lots 23 and 24 – Marine Systems and Panther Helicopter
Lot 33 – C&C Boatworks

3.3 Limits of Right-of-Way

For the levee alternatives, the limit of the existing USACE right-of-way on the protected side is approximately 110 feet from the existing levee centerline, measured relative to the existing federal baseline. For the floodwall along Engineers Road alternatives, it is assumed that the Louisiana Department of Transportation and Development (LDOTD) right-of-way is 20 feet from the edge of Engineers Road, which coincides with many of the properties' fences. The existing rights-of-way would accommodate Alternatives 6 and 7. However, levee Alternatives 1, 2, and 3, as well as floodwall Alternatives 4 and 5, will require additional right-of-way.

3.4 Level of Protection

The existing levee is generally 8.0 feet NAVD88, with some gaps as described above. The current construction will raise the level of protection to El. 10.0 NAVD88, with fewer gaps.

SECTION 4 – DESCRIPTION OF PROPOSED ALTERNATIVES

4.1 Type of Protection and Alignment

Alternatives 1 and 2

This project designated the 100-year level of protection to be at El. +14.0 NAVD88. Alternatives 1 and 2 as described in the scope of work have many similarities with regards to gate locations, ramp locations, overbuild elevations, and levee setbacks.

Alternative 1 is a levee enlargement to provide the 100-year level of protection with geotextile reinforcements. Alternative 2 is a levee enlargement constructed with soil-mixing to provide the 100-year level of protection. Both alternatives require access ramps as required and gates at sixteen (16) locations specified in the scope of work.

After the geotechnical analysis was performed along the project reach, it was determined that the levee enlargement will have to be overbuilt 2 feet to El. +16 NAVD88 to account for settlement. The centerline of the new levee would be located approximately 87.5 feet from the water's edge. Refer to Appendix C for the alignment.

In order to lay the geotextile fabric for Alternative 1, it is anticipated that the levee would be degraded to El. +6.0 NAVD88 to install the fabric. Several stages of fill placement with subsequent waiting periods would then be required to elevate the levee to the required 100-year elevation with overbuild of El. +16 NAVD88. After initial construction to El. +16, it is estimated that about 2 feet of settlement will occur within about 3 to 6 months, at which time fill will need to be added to maintain the levee at a level above the elevation +14-foot 100-year level.

It is estimated that the soil mixing depth for Alternative 2 will be El. -20.0 NAVD88. In order to perform the deep soil mixing for Alternative 2, it is anticipated that the levee would be degraded to El. +6.0 NAVD88 to provide a work platform. The levee would then be constructed to El. +16. After initial construction to El. +16, it is estimated that about 2 feet of settlement will occur within about 25 months, at which time fill will need to be added to maintain the levee at a level above the elevation +14-foot 100-year level.

Alternatives 1 and 2 require the installation of gates of varying sizes at sixteen (16) locations along the canal reach. There are three possible gate designs and sizes: 30-foot swing gates, 50-foot roller gates, and 68-foot roller gates. The scope of work designated the stations for 3 – 50 foot roller gates, 1 – 68 foot roller gate, and 12 – 30 foot swing gates. All gates were designed with a sill elevation of El. +5.0 NAVD88 with ramps extending from the sill to natural ground elevation on a slope of 1V:10H. This slope is the maximum slope that will allow unloaded cranes and equipment to traverse the levee to access the canal.

At locations where ramps currently exist, but gates are not required for construction to the 100-year elevation, the ramps will have to be reconstructed to El. +16 NAVD88 at a slope of 1:10 to

allow for access to the water. Approximately 170 feet of area is required from the water's edge to the centerline of the proposed levee to allow for ramps to be built on the flood side from El. +16 NAVD88 to existing ground elevation (assumed to be El. -1.0 NAVD88). At ramp locations that did not have the minimum 170 feet of area, the centerline of the levee was set back towards the protected side in order to gain the necessary space on the flood side for the access ramps. It is anticipated that Alternatives 1 and 2 will both need 846,000 cubic yards of embankment.

It should be noted, that in the investigation of all alternatives, current guidance requires that no more than 1,000 feet of levee section be degraded at one time.

Alternative 3

Alternative 3 requires a standard levee enlargement of the existing levee with access ramps access ramps as required and gates at sixteen (16) locations specified in the scope of work.

After the geotechnical analysis was performed along the project reach, it was determined that the levee enlargement will have to be overbuilt 2 feet to El. +16.0 NAVD88 to account for settlement. In addition to the overbuild of the levee, the standard levee enlargement will require sizeable stability and seepage berms on the flood and protected sides of the levee. The toe of the protected side levee is anticipated to meet existing ground elevation at approximately 430 feet from the water's edge. Refer to the Plan and Profile plates in Appendix C for the alignment.

Similar to Alternatives 1 and 2, this alternative requires the installation of 30-foot, 50-foot, or 68-foot gates at sixteen (16) locations along the canal reach. All gates were designed with a sill elevation at El. +5.0 NAVD88 with ramps extending from the sill to natural ground elevation on a slope of 1V:10H. This slope is the maximum slope that will allow unloaded cranes and equipment to traverse the levee to access the canal.

At locations where ramps currently exist, but gates are not required for construction to the 100-year elevation, the ramps will have to be reconstructed to El. +16 NAVD88 at a slope of 1:10 to allow for access to the water. Due to the sizeable distance that this levee alignment is set back from the water's edge, the access ramps can be constructed to El. +16.0 NAVD88 without any additional set back towards the protected side of the centerline of the levee. It is anticipated that Alternative 3 will need 2,336,000 cubic yards of embankment.

Alternatives 4 and 5

Alternatives 4 and 5 consist of 100-year level (El. +14.0 NAVD88) of protection being provided by floodwalls along the flood sides of Engineers Road and WPA Road. The alignment of the floodwalls is the same for both alternatives. Refer to the Plan and Profile plates in Appendix C for the alignment. Alternative 4 entails construction of the floodwall with access gates at each property entrance. Alternative 5 requires the construction of floodwalls along Engineers Road and WPA Road with a limited number of access gates and a parallel access road constructed along the flood side of the proposed floodwall.

The alignment for the Alternatives 4 and 5 were provided by the USACE. This alignment was chosen to minimize the impact of the floodwall on a proposed bridge that is to be constructed across the Algiers Canal at Peters Road. This alignment may be revised when final design plans are completed for the proposed bridge. Other influences on the alignment are a water tower located near Belle Chase Highway and a low lying area in the vicinity of WPA Road. The wall has been positioned to minimize any impact on the existing water tower. The proposed alignment currently intersects the low lying area which contains a pond and may have wetland implications. If this alternative is chosen, this area may need further investigation and the alignment may need to be revised. Refer to Appendix C for the proposed wall alignments.

For this preliminary engineering study, the same floodgate sill elevations and drainage design are used for Alternatives 4 and 5. All of the floodgates for Alternatives 4 and 5 are assumed to have sill elevations at El. -5.5 NAVD88, which is the lowest ground elevation point provided by the survey along Engineers Road.

Based on analysis of aerial photos and site reconnaissance, the number of floodgates for Alternative 4 that will be required to provide access at each property entrance is forty eight (48). Of the forty eight gates, four (4) were assumed to be 68 foot roller gates and three (3) were to be 50 foot roller gates to provide access at the public road intersections and at larger property driveways. The remaining 41 gates are 30 foot swing gates.

The number of gates that is recommended for Alternative 5 is nine (9). This number of gates would enable access onto the proposed parallel road on the flood side of the floodwall approximately every 0.5 miles of the 5 mile project reach. All of these gates should be 68 foot roller gates to allow access of large equipment onto the access road in either direction. In addition, the gates are preliminarily located at the roadside of undeveloped property to reduce traffic volume at the developed industrial properties.

Alternative 6

Alternative 6 is a levee enlargement to provide the 100-year level of protection with construction of a floodwall along the protected side slope of the existing levee with access gates at each ramp.

It was determined that the wall will be constructed on the protected side slope of the levee with the bottom of the base located at El. +4.0 NAVD88. The wall would be constructed to El. +14.0. The flood side face of the floodwall will be approximately 25 feet towards the land side from the existing centerline of the levee. Once the wall is constructed, the existing levee will be shifted towards the wall so that the land side crest of the levee will be at the face of the wall at El. +11.0. According to the USACE, in order to provide protection from barge impact, the flood side levee in front of the wall must be at El. +11.0. A berm will be constructed on the protected side of the floodwall starting at El. +10.0 and sloping at 1V:5H to existing natural ground. Refer to the Plan and Profile plates for the alignment. While this plan provides a means for eliminating the barge impact load, moving the alignment of the wall off of the centerline of the levee results in producing a large down drag load on the piles that must be accounted for in the pile foundation.

The impacts of this down drag load are discussed further in Section 5.4.6.

This alternative requires the installation of gates at each ramp location along the canal reach for a total of 44 gates. There are three possible gate designs and sizes which are 30-foot swing gates, 50-foot roller gates, and 68-foot roller gates. Based on existing industrial operations, it is determined that 3 – 50 foot roller gates, 1 – 68 foot roller gate, and 40 – 30 foot roller gates will be required. All the gates are designed with a sill elevation at El +5.0 NAVD88 with ramps extending from the sill to natural ground elevation on a slope of 1V:10H. This slope is the maximum slope that will allow unloaded cranes and equipment to traverse the levee to access the canal. It is anticipated that Alternative 6 will need 365,000 cubic yards of embankment.

Alternative 7

Alternative 7 is a levee at El +10.0 with access gates at sixteen (16) locations specified in the scope of work. Currently, the levee along this reach is being constructed to El +10.0 so no additional levee enlargement is required for this alternative.

This alternative requires the installation of gates of varying sizes at sixteen (16) locations along the canal reach. There are three possible gate designs and sizes which are 30-foot swing gates, 50-foot roller gates, and 68-foot roller gates. Based on existing industrial operations, it is determined that 3 – 50 foot roller gates, 1 – 68 foot roller gate, and 12 – 30 foot swing gates. All the gates for this alternative are designed with a sill elevation at El +4.0 NAVD88 with ramps extending from the sill to natural ground elevation on a slope of 1V:10H. This slope is the maximum slope that will allow unloaded cranes and equipment to traverse the levee to access the canal.

SECTION 5 – DESIGN CRITERIA SUMMARY BY ALTERNATIVE

5.1 Assumptions

5.1.1 Geotechnical

5.1.1.1 General

The first part of the EAR study consisted of initial stability analyses to determine the area of the project alignment with the most critical surface and subsurface conditions. For this purpose, the project alignment was divided into five (5) soil reaches, and slope stability analyses were performed using composite topographic cross-sections and normalized strength and unit weight values for each of the reaches. The cross-section data was taken from landside topographic surveys performed by URS surveyors in combination with Government furnished canal bottom hydrographic data. Soil stratification, shear strength and unit data were taken from Government furnished subsurface information.

After the critical soil reach was selected, the alternative designs listed above were evaluated as per the requirements listed in the Statement of Work (SOW) for the project.

5.1.1.2 References

The following USACE publications and computer software were used during this project:

USACE Publications:

- EM 1110-2-1902, Slope Stability, Oct. 03
- EM 1110-2-1913, Design and Construction of Levees, Apr. 00
- EM 1110-2-1901, Seepage Analysis and Control for Dams, Apr 93
- DIVR 1110-1-400, Soil Mechanic Data, Dec. 98 (https://inet.mvk.usace.army.mil/offices/im/private/cis/publications/mvdpubs.htm
- ETL 1110-2-569, Design Guidance for Levee Underseepage, May 05

New Orleans District Publications:

- Hurricane and Storm Damage Risk Reduction System (HSDRRS) Design Guidelines, Oct. 08

Computer Software:

- Slope Stability Program based on “MVD Method of Planes” (Method of Planes Program and plotting program is available by contacting the New Orleans District)
- Slope Stability Programs based on “Spencer’s Procedure” using the SlopeW computer program.
- Slope Stability Programs based on “Spencer’s Procedure” using the GSTABL computer program for geotextile reinforcement.

5.1.2 Structural

5.1.2.1 General Assumptions

In order to reduce the number of analyses to be performed, several assumptions had to be made with respect to the gates and monoliths analyzed. Some of these assumptions are from the scope of work and others were provided as points of clarification in the proposal. These assumptions included:

- Three gate designs will be analyzed for each alternative and will include designs for a 30-ft swing gate, a 50-ft roller gate, and a 68-ft roller gate
- Gate and gate monolith designs will be performed for each alternative using the tallest gate and wall
- The 68-ft gate was used for all gates in Alternative 5
- One typical drainage monolith will be used for Alternatives 4 and 5; because of the final arrangement of the T-wall and berm for Alternative 6 a drainage monolith is not required

Barge impact load was not included in the design for all monoliths and all gates. The design of all of the gates and gate monoliths for Alternatives 1, 2, 3, and 7 included the inclusion of the 100 kip barge impact load. No barge impact load was applied to any monoliths or gates for Alternatives 4 and 5 because it was determined that the existing levee would provide a barrier that would keep barges from getting into the areas next to the floodwalls for these two alternatives. Alternative 6 included barge impact load in the gate monolith and steel gate designs only. The top of the levee section is to be raised to Elevation 11.0, which is considered high enough to prevent barge impact to the walls. The gate sills are at lower elevations and therefore, at gate monoliths would have sufficient space for a barge to impact a gate or gate monolith.

5.1.2.2 Material Weights

Material	Weight (lb/ft^3)
Water	62.4
Soil	110.0
Saturated Soil	112.0
Semi-compacted Fill	110.0
Concrete	150.0
Steel	490.0

5.1.2.3 Earth-Pressure Coefficients

Material	K_o
Sand	0.50
Clay	0.8

5.1.2.4 Design Strengths

Concrete (all T-walls)	f'_c = 4,000 psi
Reinforcing Steel	f_y = 60,000 psi
Steel (ASTM A36)	f_y = 36,000 psi

5.1.2.5 Allowable Overstress

The allowable overstresses used in the design of the structural components were based on those provided in the HSDRRS Design Guidelines dated 4 October 2007.

5.1.3 Civil

Alternative 1 and 2

For Alternatives 1 and 2, it is assumed that at all existing access ramp locations that are not designated to have gates will have ramps reconstructed to the crest of the proposed levee at El. +16 NAVD88. At the locations where the ramps are constructed at slopes of 1V:10H to the top of the proposed levee, there is not enough area on the flood side to construct a ramp to existing ground elevation. It is assumed that a setback of the levee is required at these locations to provide enough land area to construct a flood side ramp from the top of the levee to the natural ground elevation. Refer to Appendix C for levee setback locations.

Alternative 3

For Alternative 3, it is assumed that at all existing access ramp locations that are not designated to have gates will have ramps reconstructed to the crest of the proposed levee at El. +16.0 NAVD88. Due to the fact that the crown of the Alternative 3 proposed levee is set back so far from the canal, there is enough area on the flood side to construct a ramp at slopes of 1V:10H from existing ground elevation to the top of the proposed levee. No setback of the levee is required.

Alternatives 4 and 5

For the floodwall along Engineers Road alternatives, it is assumed that the Louisiana Department of Transportation and Development (LDOTD) right-of-way is 20 feet from the edge of Engineers Road, which coincides with many of the properties' fences.

Currently, drainage culverts and ditches run parallel to Engineers Road and WPA Road on both sides. Water on the flood side of the roads is drained through the flood side culverts and ditches to points where culverts run under the roads into the drainage ditch on the protected side of the road. For Alternatives 4 and 5, drainage ditches are to be constructed on the flood side of the proposed floodwall. These ditches will flow into drainage lines through the proposed floodwall at locations close to the current locations of the drainage culverts that run under Engineers Road and WPA Road.

For Alternative 4, assumptions were made on the gate sizes to be used at property entrances and public roads that intersected Engineers Road and WPA Road. It was determined that larger gates (50 foot or 68 foot roller gates) will be used at public road intersections with Engineers Road and WPA Road. Aerial imagery was evaluated and site reconnaissance was conducted to determine to appropriate size gates at property entrances.

For Alternative 5, the access road located on the flood side of the floodwall is assumed to be 30-feet wide including shoulders. Gate locations for Alternative 5 were placed approximately every half mile at undeveloped properties.

Alternative 6

Criteria require that the floodwalls be designed to withstand barge impact. For Alternative 6 the flood side berm is at El. +11.0 and is sufficiently high so that barge impact need not be considered. However, at gate locations, no berm will be present. Adding dolphins in front of the gate locations was considered but it was determined that it would not be adequate since the distance the dolphins would have to be placed from the gates would still allow room for a barge to hit a gate. Therefore, it was determined that the gates will be designed for barge impact.

Alternative 7

Alternative 7 does not require any additional lifts to the levee; however it does require gates to be installed at specific locations of the reach with ramps providing access to the gates. A gate sill elevation had to be determined that would allow the access ramps to be constructed without any setback of the gate from the existing centerline of the levee. The gate sill was determined to be at El. +4.0 NAVD88.

5.2 Field Data Collection

5.2.1 Site Reconnaissance

Shread–Kuyrkendall and Associates, Inc., was tasked with surveying cross-sections at 1,000-foot intervals along the levee reach from edge of water to the edge of Engineers Road. In addition, the surveyor identified major utilities along Engineers Road, as utilities along the canal had been identified in a previous effort. The survey was not to include area topography or research into property ownership, as the USACE instructed that aerial photography be used to approximate property lines.

URS conducted a site reconnaissance to identify other major utilities not along Engineers Road and drainage features that may be affected by the alternatives. Findings of note from both the Shread-Kuyrkendall and URS site reconnaissance include:

- Plaquemines Parish water tower on Engineers Road near the intersection with Belle Chasse Highway.

- Plaquemines Parish sewer and drainage force mains crossing existing levee at approximate stations 980+00 and 983+00, respectively.
- Plaquemines Parish water line and hydrants along Engineers Road and WPA Road.
- Bellsouth underground communications line that crosses levee at station 1150+40.
- Various Entergy overhead lines crossing levee to provide flood side work areas for property owners.
- Individual property owners who have run utilities across levee (various locations – see ROW drawings).
- Pond in the vicinity of Alsem Inc. that is along proposed floodwall alignment.

5.2.2 Survey Data

The survey was performed according to the survey plan provided by Shread-Kuyrkendall and approved by the USACE. The vertical datum used on the project is NAVD88 (2004.65), and the horizontal reference frame is NAD83 (2002.0000). Vertical and horizontal position of reference points was established via the National Geodetic Survey's Online Positioning System (OPUS). The baseline used for this project was the provided federal baseline that generally runs along the centerline of the existing levee crown. The survey data consists of the cross-sections at 1,000-foot centers, and utilities and drainage features along the east side of Engineers Road.

Surveys conform to the requirements stated in Section 9 of the latest version of the "Hurricane and Storm Damage Risk Reduction System Design Guidelines". This includes identifying a minimum of three (3) permanent benchmarks (new or existing) on design and construction drawings for all flood control projects (see plate G-2). The benchmarks were established relative to existing NAVD88 control established by the NGS, using either conventional differential leveling and/or the latest NGS-approved differential GPS network observations, with appropriate corrections to the local hydraulic design surface. Prior to and during actual construction stake out, these primary reference marks shall be verified externally and internally and field records of these survey verifications shall be permanently archived. A complete reevaluation of the vertical datum shall be conducted at each scheduled periodic inspection. The survey report and ITR have been completed and are shown in the appended Survey Report.

5.2.3 Borings and Testing

The USACE provided all geotechnical boring and testing information. This information is included in the geotechnical appendix.

5.2.4 Potential Relocations

The survey was tasked to locate major utilities (fire hydrants, power poles, drainage culverts, etc.) along Engineers Road and WPA Road. Prior survey efforts had located utilities along the levee and were used for this report. Field reconnaissance was used to locate any additional major utilities or drainage features not captured by the survey or previous information.

5.3 Design Elevation – Hydraulic Design Criteria

The hydraulic design criteria for this project are as follows:

Existing
Top of Levee: El. 10.0 NAVD 88 (2004.65) (EL 10.0 is the Phase 1 pre-Katrina authorized elevation to which the Phase 1 work will be built.)
2011 Stillwater Elevation: EL. 9.0 NAVD 88 (2004.65)

2057
Top of Levee: El. 14.0 NAVD 88 (2004.65)
Top of Structures: El. 14.0 NAVD 88 (2004.65)
Design Stillwater Level (90% SWL): EL. 11.0 NAVD 88 (2004.65)

5.3.1 Modeling and the Design Elevations

The source of the hydraulic elevations in this EAR is the USACE MVN, October 9, 2007 report: Elevations for Design of Hurricane Protection Levees and Structures, Lake Pontchartrain and Vicinity Hurricane Protection Project; West Bank and Vicinity Hurricane Protection Project, (and subsequent addenda). All elevations are in Feet NAVD88 2004.65. The Hurricane and Storm Damage Risk Reduction System (HSDRRS) includes features that provide protection from a hurricane event that would produce a 1% exceedence surge elevation and associated waves. Hydraulic modeling and analyses performed to calculate the surge elevation and wave characteristics are described in the October 9, 2007 report. After construction is complete, the HSDRRS will meet the hydraulic requirements for levee certification, as documented in draft Engineering Technical Letter (ETL), Engineering and Design, Certification of Levee Systems, for the National Flood Insurance Program (NFIP). The hydraulic elevations presented in this EAR should be considered initial elevations. Additional, more thorough engineering investigations may follow to determine final construction elevations. This EAR considers different configurations of levees and structures that may have different design elevations. The selected alternative may have effects on design elevations in adjacent contract reaches. To assure continuity of design methodology, consistency of designs across contract reaches, and provide close quality management, final design elevations utilized throughout the New Orleans area will be reviewed by the New Orleans District Engineering Division Chief of Hydraulics and Hydrologic Branch.

5.3.2 Future Analysis

As noted in the October 9, 2007 report, in the future, subsidence and sea level rise will affect elevations required for levee certification, and an analysis was performed to project the effect of these parameters on future surge elevations and wave characteristics. The New Orleans District will perform regular assessments of these and other hydrologic parameters to assure the effectiveness of the system in future years. The system will undergo a reassessment after major events, significant changes in design and analysis methodologies, or no less than once every 10 years.

5.3.3 Gages

The gage (Intracoastal Waterway at Algiers Canal Lock) is located within the contract reach and will be used for determining the tidal datum local mean sea level (LMSL) prior to construction. Additional temporary gages may be required depending on vertical accuracy requirements. The gage(s) can also be used to monitor future hydrologic conditions in the area. The datum of the gage(s) has been established to comply with criteria contained in the Vertical Control Requirements for Engineering, Design, Construction, and Operation of Flood Control, Shore Protection, Hurricane Protection, and Navigation Projects (Engineering Design Policy Memo #2). The relationship between NAVD88 2004.65 and LMSL for the gage(s) will be reevaluated and reviewed by NOAA every 5 years (or more frequently if warranted based upon rate of subsidence).

The "Vertical Datum Report" for the East of Algiers Polder contains specific information on the gage network and the relationship between LMSL and NAVD88 2004.65 for the project area.

5.4 Geotechnical/Civil Design Criteria

The first part of the EAR study consisted of initial stability analyses to determine the area of the project alignment with the most critical surface and subsurface conditions. For this purpose, the project alignment was divided into five (5) soil reaches, and slope stability analyses were performed using composite topographic cross-sections and normalized strength and unit weight values for each of the reaches. Note that a complete geotechnical analysis will be performed on the selected alternative during the preparation of plans and specifications. This analysis will conform to the guidelines included in the latest version of the "Hurricane and Storm Damage and Risk Reduction System Design Guidelines". It is not expected that this further design work will affect the selection of the preferred alternative. In addition, a geologic profile performed under a previous soils study was consulted as a reference – this geologic profile is included in Appendix D.

Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. The analyses were performed to evaluate the stability of the levee for SWL and TOW conditions (toward the protected side of the levee) and for a low water condition (toward the flood, or canal side of the levee).

Surface and subsurface cross-sections evaluated for the five soil reaches are shown in Appendix D on figures D-1 through D-15. As indicated on the figures, the top of the levee was evaluated for a 2-foot overbuild to elevation +16 to allow for settlement. In accordance with USACE guidance, the flood side slope was assumed to be 1V:5H due to wave berm requirements along the Algiers Canal.

The analyses for all 5 soil reaches indicated inadequate safety factors for all of the conditions analyzed based on the requirements of the Table 5-2, which was included in the SOW. The Factors of Safety indicated by the Method of Planes analyses for the five soil reaches are

included in the following table:

Table 5-1
Factors of Safety for Soil Reaches

Soil Reach	Protected Side Factors of Safety		Flood Side FOS
	TOW	SWL	Low Water
1	0.79	0.79	1.11
2	0.77	0.77	0.93
3	1.06	1.07	1.27
4	0.99	1.00	1.22
5	1.11	1.12	1.26

As indicated by the results of the analyses, Soil Reach 2 has the lowest safety factors and is therefore considered to be the most critical reach. All of the analyses required for the various alternative designs were therefore performed for soil reach 2.

The levee embankment design was performed using the following design criteria:

A. Using centerline borings, toe borings, CPTs, and applicable test results provided by the government, stratification, shear strength and unit weights of materials were determined and the project alignment was separated into five (5) Soil Reaches. Soil stratification, shear strength and unit data above approximate elevation -65 were taken from Government furnished subsurface information indicated by about 50 undisturbed soil test borings along the 5-mile long project alignment. Data from about 40 CPT soundings were also used in the strengthline evaluations. Deep soil data below elevation -65 was taken from the results of two borings (and lab tests) provided by the Government that were performed at the Whitney-Barataria Pump Station within the limits of the project.

The strengthlines were developed based on criteria stated in the HSDRRS Design Guidelines, New Orleans District Engineering Division, October 23, 2003." The procedure states that strengthlines should be drawn such that approximately one-third of the test results fall below the strengthline and two-thirds plot above the line. In addition to laboratory shear test results, the results of cone penetrometer test (CPT) soundings were plotted and used to determine the strengthline plots. An Nc factor of 20 was applied to point readings from the CPT soundings to estimate undrained shear strengths shown on the strengthline plots. The strengthlines thus developed and used in the computations for this project were submitted to and approved by the New Orleans District before design commenced. The strengthlines are presented in Appendix D as Figures D-92 through D-103.

B. Using cross sections derived from landside topographic surveys performed by URS surveyors and government furnished canal-bottom hydrographic data, minimum composite cross-sections were determined for each soil reach. Composite cross-sections

used in the analyses are presented in Appendix D by Figures D-104 through D-106.

C. Settlement calculations were performed to determine levee lift construction schedules for the levee Alternatives 2 and 3. The intention of the schedules was to maintain the levee at or above the 100-year elevation (+14) grade during the life of the project. An initial minimum overbuild of 2.0 feet was considered in the levee designs to account for near future settlement. Results of the settlement analyses for the proposed levee configurations for Alternatives 2 and 3 are included in Appendix D on Figures D-90 and D-91. Soil parameters used in the analyses (i.e. soil layer thicknesses, compression indices, coefficients of consolidation and unit weight) are shown on the figures. It is noted that the magnitudes of settlement indicated by Figures D-90 and D-91 reflect consolidation settlement of the compressible subgrade soils below the levee sections, and neither lateral spread nor shrinkage of the levee soils have been considered. If the levee soils are properly compacted and staged properly in terms of heights for staged construction, lateral spread and shrinkage should not be significant relative to the consolidation settlement that will occur.

D. Using the Method of Planes (Stability with Uplift program which was provided by the Government), SlopeW Spencer's method analyses and design undrained shear strengths, factors of safety were determined for the gross levee, T-wall and gate sections.

HPS Slope Stability Design Criteria

Stability design was based on criteria presented in EM 1110-2-1902 Slope Stability, 2003, for new embankment dams adapted for the MVN HPS.

INTERIM DESIGN CRITERIA FOR EARTHEN EMBANKMENTS:
HPS Slope Stability Design Criteria for Full Earthen Embankment or Floodwall

For this EAR Study, Table 5-2 below, which is based on interim design criteria for earthen embankments and which has increased factors of safety for MOP analyses, was used to evaluate the levee and floodwall conditions included in this report. The interim criteria was used for this project since a SlopeW application using the Spencer's stability analysis procedure had not been approved that efficiently modeled MVN's unique foundation conditions containing varying unit weights and shear strength within the same stratum. The intent of the interim design criteria for Study documents (EARS and Feasibility Reports) is to ensure that the appropriate Spencer's Method FOSs footprint will be obtained.

Table 5-2
Stability Design Criteria

Stability Analysis Method	Conditions	Protected Side		Flood Side
		Still Water Level (SWL)	Water at Top of Levee	Low Water Condition[1]
Method of Planes	Levee designed for a FOS [3]=	1.40	1.30	1.35
	Levee designed for a FOS [4]=	1.35	1.25	1.30
	Floodwall Stability for a FOS[4] =	1.40	1.30	1.35
Limited Spencer's Analysis[2]	Equal Unit Weights (Centerline vs. Toe)	1.50	1.40	1.40
	Different Unit Weights (Centerline vs. Toe)	1.55	1.45	1.45

1. The S-Case was also analyzed for normal water conditions toward both the protected side and flood side for the standard levee enlargement alternative. Since these analyses indicated significantly higher factors of safety than analyses for drained shear strength cases, the S-Case was not analyzed for the other levee alternatives.

2. Limited Spencer Analysis: The SlopeW program was utilized to perform a Limited Spencer's Analysis to verify the required design sections for the T-wall and gate configurations. Since the SlopeW program could not vary unit weights along a cross-section, the required factors of safety were a function of whether the actual unit weights (centerline vs. levee toe) are the same or vary due to those actual conditions.

3. Utilizing the higher Method of Planes FOS for interim design procedures should ensure that the appropriate Spencer FOS will be obtained once the levee section is analyzed with a software program that can perform Spencer Analysis and can efficiently model MVN unique foundation conditions that contain varying unit weights and shear strength within the same stratum. For earthen levees with no reinforcement, these factors of safety were used with no Spencer's Method Analysis.

4. For floodwalls and earthen levees utilizing geosynthetic reinforcement, MOP was used as the analysis/design method and Spencer's Method was used as a design check with these revised factors of safety.

E. Typical assumed values for undrained shear strength (in lieu of test results) and unit weight used in the analyses are shown below in tables 5-3 and 5-4.

Table 5-3
Typical Values for Embankment Fill

Soil Type	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)
Compacted Clay (90%)	110	400	0
Compacted Clay from Bonnet Carre (from dry borrow pit placed on land)	115	600	0
Uncompacted Clay (from dry borrow pit placed on land)	100	200	0

Table 5-4
Typical Values for Silts, Sands, and Riprap

Soil Type	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)
Silt	117	200	15
Silty Sand	122	0	30
Poorly graded sand	122	0	33
Riprap	132	0	40

Note. Weight of riprap may vary based on the filling of the riprap voids over time.

For most designs, the central portion of the levee, protected side stability berms, and floodside stability/wave berms consist of compacted clay.

Corps of Engineers Deep-Seated Stability Design Criteria.

Deep-seated stability design criteria for P&S design, presented in the "Hurricane and Storm Damage Risk Reduction System Design Guidelines, New Orleans District Engineering Division, October 23, 2007" was generally followed for T-wall and gate design for this project. The Statement of Work (SOW) for this project set the following requirements for the design computations:

For the purpose of Feasibility and EAR Studies, stability and the determination of unbalanced loads shall be achieved using the Method of Planes with the Factors of Safety (FOS) specified in Table 5-2 above. The A-E shall use the Spencer's method to check the MOP results for comparison purposes only. The Spencer's analysis shall also use the appropriate Factors of Safety in Table 5-2. The Spencer's analysis shall utilize the MOP failure plane geometry for both the SWL and TOW load cases. Additionally, the failure

plane with the next lowest FOS, as determined by MOP, shall also be checked by Spencer's method for both the SWL and TOW load cases. The Corps shall be consulted when the difference of the total unbalanced force, between the two methods, exceeds twenty (20%) percent. If an unbalanced load remains, the A-E shall utilize the established methods of addressing the unbalanced force which includes the LMVD Method of Planes analysis (traditional) to determine the anchor force on the foundation and the depths of the failure planes. The unbalanced load is transferred to the foundation through the sheet piling. The foundation analysis may utilize traditional pile group analysis programs (i.e. CPGA, ENSOFTs GROUP 7, etc.). Only steel bearing piles will be allowed where unbalanced loads exist. In order to approximate Spencer method designs, which will be produced later in P&S design, the sheet pile sizes and tip elevations shall be based on the greater of seepage requirements or a tip embedded 10' past the critical failure plane as determined by MOP.

The results of the MOP and Spencer's method analyses are presented by Figures D-1 through D-42 in Appendix D. MOP input text files and Internal Technical Review (ITR) reports for the analyses are also included in Appendix D. Computations of anchor forces to be applied to the T-wall and gate structures by sheet pile walls that will be required to resist unbalanced forces indicated in the MOP analyses are presented by Figures D-44 through D-65.

It is noted that the MOP stability analyses for T-wall and gate analyses were performed using unfactored shear strengths. The required safety factors were applied as factors to reduce the forces indicated by the analyses to determine required unbalanced loads. Experience and subsequent (unreported) confirmation computations have shown for cases where all clay soils are modeled, such as for all of the T-wall and gate analyses for this study, the two safety factor application procedures yield the same results. For the plans and specifications phase of the project, the shear strengths will be factored at the start of the analyses.

<u>The criteria for pile foundation (USACE Criteria) are as follows:</u>

Design computations for the pile foundations to support T-wall and gate structures were performed in accordance with Corps of Engineers Engineering Manual EM 1110-2-2906. Theoretical pile capacities were calculated for both the undrained and drained soil conditions and the deepest tip penetration for the design load was used in design. In accordance with New Orleans District procedures, the vertical stress in the subsurface foundation was limited to 3500 psf for determining both the undrained and drained pile capacity curves.

It is noted that only very limited soil boring data was available from USACE below elevation -65. The deep soil data was taken from the results of two borings (and lab tests) provided by the Government that were performed at the Whitney-Barataria Pump Station within the limits of Soil Reach 2. The analyses were performed based on a critical failure plane at elevation minus -25, which was indicated in the MOP analyses for the Alternatives 4 and 5 (Engineers Road) T-wall

analyses. According to the design procedure, all skin friction on the pile shaft was deducted above the critical plane. It is noted that the critical failure plane was at elevation -40 for the Alternative 6 T-wall structure. No unbalanced loads were indicated for the Alternatives 1, 2, 3, 6 and 7 gate structures, which means no skin-friction deduction would be in order for those structures. The decision was made to use the capacities for the elevation -25 case since they did not vary significantly from the elevation -40 case (given the limited soil data) and since they were more conservative than the gate cases where no unbalanced loads were indicated. The pile capacities will be computed for the various critical plane depths for design of all T-walls and gates in the P&S phase of the project. Additional deeper borings will be required for design of pile foundations in all areas where pile-supported structures will be required. Compression and tension capacities for 14" H-piles to support the T-wall and gate structures were estimated based on undrained shear strengths. Compression capacities were also estimated for a drained shear strength case. An analysis to estimate tension capacities for drained shear strengths was not performed since, based on the results of the compression capacities, they would obviously be higher than for the undrained case, and the undrained case would therefore control. Results of the pile capacity analyses are presented on Figure D-43 in Appendix D.

Typical minimum factors-of-safety to be applied to computed capacities of the compression and tension piles are as follows for the loading conditions.

Loading Condition	Factor-of-Safety Without a Pile Test	Factor-of-Safety With a Pile Test
Q-case	3.0	2.0
S-case	1.5	1.5

It is recommended that steel H-piles, driven with an impact hammer, be used to support the T-wall and gate structures. According to common practice, the frictional resistance of granular soils against the steel piles was reduced in tension (K_t).

Other design criteria of note include:

- *Floodwalls* - Floodwall design criteria are included in the "Hurricane and Storm Damage Risk Reduction System (HSDRRS) Design Guidelines, New Orleans District Engineering Division, October 23, 2003."

- *Lateral Earth Pressure* - At-Rest soil coefficients commonly used by New Orleans District are 0.8 for a clay backfill and 0.5 for sand backfill when utilizing the general wedge method for computing earth pressures.

- *Bearing Capacity* - Factor of Safety of 3.0.

- *Dewatering* - Design should be such that groundwater drawdown outside the construction easement is not affected. The dewatering system used during construction will be Contractor-designed.

- *Cantilever Retaining Walls and Braced Walls* - Cantilvered walls are not recommended in

this project.

- *Seepage* - The following seepage criteria, which were outlined in the SOW, were generally applied to this project:

  It is the intent of these criteria to provide requirements that result in a safe design for seepage and uplift based on loading to the top of the barrier at any stage in the life of the project. In support of that, the following criteria are based on steady state seepage conditions in coarse grained soils. Due to their permeability, it is unlikely that steady state conditions will develop in fine grained soils within the relatively short duration of a hurricane storm surge. However, open seepage entrances and non-continuity in blanket materials may allow steady state conditions to occur in coarser strata.

  The following criteria are based on ETL 1110-2-569 except that factors of safety are presented instead of seepage gradients. Factors of safety are used because of the lighter weight blanket materials that may be encountered in the local region. If the criteria presented in the following table are not met, at the levee toe, seepage berms or remediation measures shall be designed in accordance with EM 1110-2-1901, DIVR 1110-1-400 (for material properties where site specific information is not available), and ETL 1110-2-569. HPS seepage berms shall be designed for a 1.6 safety factor at the levee toe and 1.0 at the berm toe. Relief wells or other seepage control measures shall also be designed to limit the factor of safety to 1.6 along the levee toe. The factors of safety for seepage are computed using effective stresses (defined by gradient) as:

  $$FS_g = \frac{\gamma' \times z_t}{\gamma_w \times h_o} \qquad \text{same as} \qquad FS_g = \frac{I_{cr}}{I_e}$$

  γ' = effective unit wt. soil (or average effective unit weight of soil)
  γ_w = unit wt. of water
  z_t = landside blanket thickness
  h_o = excess head (above hydrostatic) at toe
  I_{cr} = critical exit gradient
  I_e = exit gradient

Table 5-5
Seepage and Uplift Design Criteria

Levee/Wall Application	Minimum Factor of Safety at Levee or Wall Toe (1)	
	Authorized Water Surface Elevation (AWSE)	Top of Protection(2)
Riverine	1.6	1.3
Coastal (Top of Protection < 5 ft above AWSE)	1.6	1.3
Coastal (Top of Protection > 5 ft above AWSE)	1.6	1.2

Notes:
(1) Minimum factors of safety at the levee toe are based on steady state seepage conditions. Loading in excess of the "Top of Protection" is considered sufficiently short term that steady state conditions do not fully develop and safety is adequately addressed by the steady state factors of safety.
(2) The top of protection includes increases above the authorized water surface elevation to account for runup and/or grade elevations for other reasons minus overbuild for primary consolidation.

The borings indicated that the soils within the project limits were predominantly clays. A significant sand layer was indicated in Soil Reaches 3 and 5, and seepage and stability analyses were performed based on the presence of this sand layer. It is noted that isolated sand layers were indicated at varying depths in Soil Reaches 1, 2 and 4. In these reaches, seepage analyses to evaluate the above uplift safety factors and piezometric surfaces used in the MOP and Spencer's methods stability analyses were computed based on the presence of these sand layers. The MOP and Spencer's method analyses were however performed assuming that the sand layers were not present since the clay strengths were less than the sand strengths, even with uplift in the sand layers. The results of seepage analyses for the various levee, T-wall and gate configurations evaluated are included herein as Figures D-66 through D-89 in Appendix D.

Specific criteria for each alternative are addressed in the following sections.

5.4.1 Alternative 1

Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. Analyses were also performed using Spencer's method as a check of the MOP results. The analyses were performed to evaluate the stability of the levee for SWL and TOW conditions (toward the protected side of the levee) and for a low water condition (toward the flood, or canal side of the levee). Surface and subsurface cross-sections evaluated in the analyses are shown on figures D-16 through D-18 in Appendix D. As indicated on the figures, the top of the levee was evaluated for a 2-foot overbuild to elevation +16 to allow for settlement. The flood side slope was evaluated with a 1V:5H slope to meet wave berm requirements.

Sequence of construction for the geotextile reinforcement will be as follows:

1. Degrade existing levee to approx El. 6 ft
2. Install CB Wall as shown (could also place on flood side)
3. Install PV Drains (no PV drains for 12 to 20 ft center)
4. Place Geonet over PV drains (no Geonet for 12 to 20 ft center)
5. Place lowest GT layer (Allowable wide-width tensile strength of 24,000 lb/ft, at 5% strain, and ultimate wide-with tensile strength of 45,000 lb/ft using partial FS for creep of 1.7 for polyester and 1.1 for installation damage).
6. Place three 8-inch clay lifts (24 inches total)
7. Place middle GT layer (Allowable wide-width tensile strength of 14,000 lb/ft, at 5% strain, and ultimate wide-with tensile strength of 26,000 lb/ft using partial FS for creep of 1.7 for polyester and 1.1 for installation damage).
8. Place three 8-inch clay lifts (24 inches total)
9. Place highest GT layer (Allowable wide-width tensile strength of 10,000 lb/ft, at 5% strain, and ultimate wide-with tensile strength of 19,000 lb/ft using partial FS for creep of 1.7 for polyester and 1.1 for installation damage).
10. Place Clay in 8-inch lifts to Stage 1 (A 15 feet wide protected side stability berm will be required to be placed to about El. 6 feet for anchorage of lowest geotextile)
11. Wait approx. 6 months for clay to gain strength
12. Place Clay in 8-inch lifts to Stage 2
13. Wait approx. 6 months for clay to gain strength
14. Place Clay in 8-inch lifts to Stage 3
15. Wait approx. 6 months for clay to gain strength
16. Place Clay in 8-inch lifts to Stage 4 with 2 ft overbuild

The results of the stability analyses are presented on attached Figures D-16 through D-18 and Figures D-35 and D-36. The results of the stability analyses performed for design of the geotextile reinforced levee are summarized in the following table:

Table 5-6
Results of Stability Analyses – Geotextile Reinforced Levee

Analysis Condition	Required Safety Factor	Computed Safety Factor
MOP - Protected Side – TOW	1.25	1.32
MOP Protected Side – SWL	1.35	1.41
MOP Flood Side – Low Water	1.30	1.63
Spencer's Protected Side – TOW	1.45	1.48
Spencer's Protected Side - SWL	1.55	1.57

It is anticipated that the levee will have a total long term settlement of about 4 feet after the initial construction is complete. It is likely that about 2 feet of settlement will occur within about 3 to 6 months after the initial construction to El. +16, and it will be necessary to add fill at that

time to maintain the levee at a level above the elevation +14-foot 100-year level. Because of inaccuracies inherent in time settlement prediction, it is recommended that settlement of the levee be closely monitored to make sure that the design grade is maintained. For this purpose, it is recommended that settlement be monitored weekly until a predictable settlement pattern is noted and then monthly.

MOP analyses for the gate structure for Alternative 6 indicated that unbalanced forces will not exist for that configuration. By observation, the gate/levee requirements for Alternative 1 are no worse than those for Alternate 6. Based on the analyses that were performed, the analyses for the gate in Alternative 6 are considered to be adequate for the gate in Alternative 1, and no unbalanced forces are expected for the Alternative 1 gates.

5.4.2 Alternative 2

Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. The analyses were performed to evaluate the stability of the levee for SWL and TOW conditions (toward the protected side of the levee) and for a low water condition (toward the flood, or canal side of the levee). Surface and subsurface cross-sections evaluated in the analyses are shown on figures D-19 through D-21 in Appendix D. As indicated on the figures, the top of the levee was evaluated for a 2-foot overbuild to elevation +16 to allow for settlement. The flood side slope was evaluated with a 1V:5H slope to meet wave berm requirements.

For deep mixed soil, the following material properties were assumed for the analyses:

- Unconfined compressive strength (Qu) of mixed columns = 100 psi, or
- Undrained shear strength (Su) of mixed columns = 50 psi
- Allowable Su ~ 50 psi/FoS = 40 psi = 5,760 psf
- Assuming 30% replacement ratio (neglecting soil strength), composite Su = 1,728 psf.

The results of the stability analyses are presented on attached Figures D-19 through D-21. The analyses indicated that deep soil mixing should extend down to approximate elevation -20 under the entire footprint width of the levee to satisfy the safety factor requirements for all of the conditions analyzed based on the requirements of the SOW. The results of the MOP analyses are summarized in the following table:

Table 5-7
Results of Stability Analyses – Soil Mixing Levee

Analysis Condition	Required Safety Factor	Computed Safety Factor
Protected Side – TOW- Q-Case	1.30	1.30
Protected Side – SWL- Q-Case	1.40	1.41
Flood Side – Low Water – Q-Case	1.35	1.54

An analysis performed for this alternative indicated that the levee will have a total long term settlement of about 40 inches. As indicated by the curve on Figure D-90, it is estimated that this

settlement should occur over a period of about 15 to 20 years. It is also estimated that about 2 feet of settlement will occur within about 25 months. In order to maintain the levee at a level above the elevation +14-foot 100-year level, it will be necessary to add about 2 feet of fill about 2 years after the levee construction has been completed. Because of inaccuracies inherent in time settlement prediction, it is recommended that settlement of the levee be closely monitored to make sure that the design grade is maintained. For this purpose, it is recommended that settlement of the enlarged levee be monitored weekly for the first 3 months, monthly thereafter until a predictable settlement pattern is noted and then semi-annually.

MOP analyses for the gate structure for Alternative 6 indicated that unbalanced forces will not exist for that configuration. By observation, the gate/levee requirements for Alternative 2 are no worse than those for Alternate 6. Based on the analyses that were performed, the analyses for the gate in Alternative 6 are considered to be adequate for the gate in Alternative 2, and no unbalanced forces are expected for the Alternative 2 gates.

5.4.3 Alternative 3

Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. The analyses were performed to evaluate the stability of the levee for SWL and TOW conditions (toward the protected side of the levee) and for a low water condition (toward the flood, or canal, side of the levee). As indicated on the figures, the top of the levee was evaluated for a 2-foot overbuild to elevation +16 to allow for settlement. The flood side slope was evaluated with a 1V:5H slope to meet wave berm requirements. According to the analyses, it will be necessary to move the levee away from the canal and construct stability berms on the protected and flood sides of the levee. Surface and subsurface cross-sections evaluated in the analyses are shown on attached figures D-22 through D-26.

Including a protected side stability berm, the analyses indicated that the protected side toe of the enlarged levee should extend about 335 feet landward of the existing protected side levee toe to satisfy the safety factor requirements for all of the conditions analyzed based on the requirements of the SOW. The results of the MOP analyses are summarized in the following table:

Table 5-8
Results of Stability Analyses – Enlarged Levee

Analysis Condition	Req'd Safety Factor	Computed Safety Factor
Protected Side – TOW- Q-Case	1.30	1.33
Protected Side – SWL- Q-Case	1.40	1.40
Flood Side – Low Water – Q-Case	1.35	1.35
Protected Side – Normal Water – S-Case	1.35	2.61
Flood Side – Normal Water – S-Case	1.35	2.60

An analysis performed for this alternative indicated that the levee will have a total long term settlement of about 6 feet. As indicated by the curve on Figure D-91, it is estimated that this settlement should occur over a period of about 15 to 20 years. It is also estimated that about 2

feet of settlement will occur within about 5 months and another 2 feet about 22 months thereafter. In order to maintain the levee at a level above the elevation +14-foot 100-year level, it will be necessary to add 2-foot lifts of fill about 5 months and 27 months after the initial levee construction has been completed. Given the construction duration for this project, it will be necessary to add the first lift of additional fill at the end of the initial construction period. Because of inaccuracies inherent in time settlement prediction, it is recommended that settlement of the levee be closely monitored to make sure that the design grade is maintained. For this purpose, it is recommended that settlement of the enlarged levee be monitored weekly for the first 3 months, monthly thereafter until a predictable settlement pattern is noted and then semi-annually.

MOP analyses for the gate structure for Alternative 6 indicated that unbalanced forces will not exist for that configuration. By observation, the gate/levee requirements for Alternative 3 are no worse than those for Alternate 6. Based on the analyses that were performed, the analyses for the gate in Alternative 6 are considered to be adequate for the gate in Alternative 3, and no unbalanced forces are expected for the Alternative 3 gates.

5.4.4 Alternative 4

A single T-wall analysis, considering TOW and SWL conditions, was considered to be applicable to Alternatives 4 and 5. Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. Unbalanced forces to be used in the structural computations for the T-wall design were computed based on USACE procedures. Analyses were also performed as a check using Spencer's method procedure. The analyses were performed to evaluate the design of the T-wall (and gate) structures for SWL and TOW conditions toward the protected side of the structures. Surface and subsurface cross-sections evaluated in the analyses are shown on attached figures D-27 and D-28 and Figures D-37 and D-38.

The analyses indicated that unbalanced forces will exist, which must be accounted for in the design using a sheet pile wall. The results of the analyses are summarized in the following table:

Table 5-9
Results of Stability Analyses – Floodwalls

Analysis Condition	Required FOS	Computed FOS	Maximum Unbalanced Load		Anchor Force, kips/ft
			kips/ft	Elevation	
P.S. TOW – MOP	1.30	0.72	6.86	-25	4.21
P.S. SWL – MOP	1.40	0.88	4.28	-25	2.45
P.S. TOW – Spencer	1.40	1.14	5.91	-30*	--
P.S. SWL – Spencer	1.50	1.37	2.26	-30*	--

* Critical plane elevation.

5.4.5 Alternative 5

The same analyses and results apply as for Alternative 4.

5.4.6 Alternative 6

The new T-wall was originally evaluated at the landside toe of the existing levee. For this original configuration, the MOP T-wall analyses indicated that very high unbalanced forces would result. To reduce the unbalanced forces, USACE requested that a condition with the T-wall embedded in the levee near the protected side crest of the levee section be evaluated. Analyses were also performed for a typical gate structure associated with the Alternative 6 T-wall configuration.

Factors of safety against global stability were calculated using the USACE Method of Planes (MOP) UPLIFT computer program. Unbalanced forces to be used in the structural computations for the T-wall designs were computed based on USACE procedures. Analyses were also performed as a check using Spencer's method procedure. The analyses were performed to evaluate the design of the T-wall (and gate) structures for SWL and TOW conditions toward the protected side of the structures. Surface and subsurface cross-sections evaluated in the analyses are shown on attached figures D-29 through D-34.

The analyses indicated that unbalanced forces will exist for the T-wall/levee configurations analyzed, and the unbalanced forces must be accounted for in the design using a sheet pile wall. The analyses indicated that unbalanced forces will not exist for the gate structure analyzed. The results of the MOP analyses are summarized in Table 5-10.

An issue was raised during the review of the 95% submission regarding down drag on the piles. Typically T-walls are built at grade or are built on areas that have been degraded and for these conditions no down drag will take place. However, when new fill material is placed over areas where there are piles, then down drag will occur. Because the T-wall for Alternative 6 is to be moved off of the centerline of the levee it results in requiring fill material to be placed to a depth of as much as 10 feet over the area that covers the protected side slope of the existing levee. The alignment of the wall was moved from the levee centerline in order that the earthen section on the flood side could be built to Elevation 11.0, which would provide a barrier against barge impact. Placing dolphins on the flood side of the wall was considered for providing protection against barge impact in order that the wall alignment could remain on the centerline of the current levee, but the costs for adding dolphins was prohibitive. In addition, degrading the levee to build a T-wall was not considered to be a viable alternative since it would disturb the existing flood protection and leave gaps in the existing flood protection during hurricane season.

Consequently, the settlement that could result from the fill to be added is calculated to be as much as 40 inches, which translates into 200 kips of drag load. Based on the preliminary calculations the required pile tips would need to be 35 to 50 feet deeper due to the down drag loads. This is a significant increase in the pile depth for Alternative 6, however, because Alternative 6 was not the preferred alternative (even if no sector gate complex to the south is constructed) no calculations beyond the preliminary calculations were performed.

Table 5-10
Results of Stability Analyses – Alternative 6

Analysis Condition	Required FOS	Computed FOS	Maximum Unbalanced Load		Anchor Force, kips/ft
			kips/ft	Elevation	
T-Wall Offset from Protected Side Toe of Levee (see Figures D-29 and D-30)					
P.S. TOW - MOP	1.30	0.90	28.77	-50	--
P.S. SWL – MOP	1.40	1.02	23.36	-50	--
P.S. TOW – Spencer	1.45	--	--	--	--
P.S. SWL - Spencer	1.55	--	--	--	--
T-Wall Embedded in Levee (see Figures D-31 and D-32 and Figures D-39 and D-40)					
P.S. TOW - MOP	1.30	1.06	9.45	-40	5.78
P.S. SWL – MOP	1.40	1.18	6.10	-30	3.67
P.S. TOW – Spencer	1.45	1.24	7.68	-25*	--
P.S. SWL - Spencer	1.55	1.55	4.99	-25*	--
Gate Through Existing Levee (see Figures D-33 and D-34 and Figures D-41 and D-42)					
P.S. TOW - MOP	1.30	1.24	None	--	--
P.S. SWL – MOP	1.40	1.46	None	--	--
P.S. TOW – Spencer	1.45	1.47	None	--	--
P.S. SWL - Spencer	1.55	1.68	None	--	--

* Critical plane location.

The MOP analyses for the gate structure for Alternate 6 indicated that unbalanced forces will not exist. MOP analyses for gates required along the existing levee alignment in Alternates 1, 2, and 3 also indicated no unbalanced forces. By observation, the gate/levee requirements for Alternate 7 are no worse than those for Alternate 6. Based on the analyses that were performed, the analyses for the gate in Alternate 6 are considered to be adequate for Alternates 1, 2, 3 and 7, since no unbalanced forces are expected for gates at any of these locations.

5.4.7 Alternative 7

The levee has been designed for the Phase 1 pre-Katrina authorized elevation (+10) and is currently being raised to that level without geotextile reinforcement. Stability analyses have therefore not been performed for the levee in this alternative.

The MOP analyses for the gate structure for Alternative 6 indicated that unbalanced forces will not exist for that configuration. By observation, the gate/levee requirements for Alternative 7 are no worse than those for Alternate 6. Based on the analyses that were performed, the analyses for the gate in Alternative 6 are considered to be adequate for the gate in Alternative 7, and no unbalanced forces are expected for the Alternative 7 gates.

5.5 Structural Design Criteria

5.5.1 General

The structural designs performed as part of this Engineering Alternatives Report were performed in accordance set forth by standard engineering practice and criteria set forth in Engineering Manuals, Regulations, and Technical Letters for civil works construction published by the Office, Chief of Engineers and as amended based on the criteria provided in the design guidelines developed by the New Orleans District and the Scope of Work for this project. The criteria utilized are consistent throughout the seven different alternatives that were examined.

5.5.2 References

Technical Publications
American Concrete Institute, Building Code Requirements for Structural Concrete and Commentary (ACI 318-05/318R-05) to be used in conjunction with USACE EM 1110-2-2104.

American Institute of Steel Construction (AISC), Manual of Steel Construction, Allowable Stress Design, 9th Edition

American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)

American Welding Society, Structural Welding Code, Steel (AWS D1.1-02)

USACE Publications:

EM 1110-2-2104	Strength Design Criteria for Reinforced Concrete Hydraulic Structures; Change 1 (Aug 03)
EM 1110-2-2015	Design of Hydraulic Steel Structures; Change 1 (May 94)
EM 1110-2-2502	Retaining and Floodwalls (Sep 89)
EM 1110-2-2906	Design of Pile Foundations (Jan 91)

New Orleans District Publication:
Hurricane and Storm Damage Risk Reduction System Design Guidelines (23 October 2007)

Computer Software:
Pile Group Analysis (CPGA), CASE Program No. X0080 – CPGA was utilized for analysis of the pile foundations because it was referenced in the project scope of work and in EM 1110-2-2906, Design of Pile Foundations, and has been utilized to design the pile foundations in the New Orleans area.

Analysis of Frame Structures (CFRAME), CASE Program X0030 – CFRAME was used because it was referenced in the project scope of work, because of its availability, and because it has been successfully used for analyses of similar types of gate structures.

5.5.3 Pile Foundations

Pile designs were performed based on use of the pile group analysis program CPGA and the pile capacities provided by the geotechnical engineer. The allowable capacity of the piles was derived by using a factor of safety of 2 on the ultimate capacities provided by the geotechnical investigations.

5.6 Utility Relocations Design Criteria

All alternatives will affect utilities to some degree. The levee alternatives primarily affect local property owners with some major pipelines crossing the levee and other minor work-specific utilities such as air lines, floodlights, utility sheds, etc. The floodwall options primarily affect utilities along Engineers Road and WPA Road.

It is assumed that all relocated pipelines crossing the existing levee will be out of the proposed levee section, or in the case of parallel utilities along the roads, at least 15 feet from the base of the proposed floodwall. Due to the shifting of the levee towards Engineers Road, there may be additional utilities on the private properties that were not located due to the limit of survey scope.

5.7 Environmental Impacts/Other Criteria

Due to the historic industrial land use within certain areas, the potential for encountering a HTRW site during construction is possible. There is also a low lying area near WPA Road that is in the proposed alignment for Alternatives 4 and 5 that may need to be evaluated for the possibility of being a wetland area.

Line of sight along Engineers Road was evaluated while the wall alignments for Alternatives 4 and 5 were being determined. The walls were set back far enough to allow for adequate sight lines per LDOTD. If the wall alignment is relocated at any point, the line of sight must be re-evaluated.

5.8 Armoring

Armoring will be provided for critical areas of the HSDRRS features described in this report. The design criteria determining the overtopping rates and armoring methods are still under investigation. Therefore, a detailed description of the armoring for the features in this report is not available. This work will continue in parallel with other pre-award activities until complete. The Armoring Team is tasked to provide research and planning for the use of armoring against erosion and scour on the protected side of selected critical portions of levees and floodwalls in the HSDRRS. These critical areas include: transition points (where levee and floodwalls transition into any hardened feature such as other levees, floodwalls, pump stations, etc.), utility pipeline crossings, floodwall protected side slopes, and earthen levees that are exposed to wave and surge overtopping during a 500-year surge elevation. The Armoring Team will be guiding the design PDT in this process by providing an Armoring Manual for design guidance and criteria. This manual will be the basis for decisions on what should be armored and how

armoring should take place. The Armoring Team defines resiliency as the capacity of the levee/floodwall to resist, without catastrophic failure, overtopping (wave and surge) caused by a storm which is greater than the design event. A Resilience Team has been formed to validate the Armoring Team's initial focus. MVN Engineering Division is leading the Resiliency effort to affirm the practicality and applicability of using the 500-year surge elevation for armoring. The armoring methods to be implemented in the final design are anticipated to provide erosion protection such that the structure will be resilient to the 500-year surge elevation, or more defined as the ability of the structure to provide protection during events greater than the design event without catastrophic failure.

The following armoring methods are under consideration and the appropriate combination of methods will be applied throughout the earthen levee projects included in the HSDRRS:

- ACB – Articulated Concrete Blocks
- ACB/TRM – the physical conditions or hydraulic parameters are such that small modifications could allow a reduction to a TRM (Turf Reinforcement Mattress)
- TRM
- TRM/Grass – the physical conditions or hydraulic parameters are such that small modifications could allow a reduction to a surface with good grass cover only
- Good Grass Cover

The armoring required for floodwalls will be a hybrid of materials to accomplish the required level of armoring. For instance, the interim floodwall repairs curtailed the concrete splash pads midway down the levee slope. The Armoring Team suggests that these pads be extended down the entire slope of levee and be curtained at the toe in order to eliminate a transition in a critical part of the levee section. Transitions have been a significant part of the Armoring Team's effort to date. The transitions from structures to floodwalls to sheetpiles are being addressed with detailed design drawings and will be forwarded to the individual design PDTs to aid them in their site-specific designs. Pipeline crossings are being identified by the Relocations Section in MVN. The Armoring Team is reviewing their detail drawings and requirements to include armoring features. These drawings will need ITR and should be forwarded to those utility owners that are ultimately responsible for the work.

SECTION 6 – REAL ESTATE/RIGHT-OF-WAY REQUIREMENTS

In order to provide the 100 year level of protection, permanent ROW and temporary servitudes will have to be attained prior to construction. Temporary servitudes consist of temporary construction servitudes, pile servitudes, and limits of construction. Access road servitude and staging areas/trailer locations will also have to be acquired.

Permanent ROW is assumed to extend an additional 15 feet on the protected side toe of the proposed levee or 15 feet towards the canal from the edge of the proposed flood side drainage ditch along Engineers Road and WPA Road. Temporary construction servitudes, pile servitudes, and limits of construction are estimated to extend an additional 50 feet from the permanent ROW. Temporary access roads are shown on the ROW plates in Appendix F and will be used to provide temporary access to the project reach during construction. A staging area/trailer location that is currently being used for the elevation of the existing levee to El +10.0 NAVD88 is shown on the ROW plates in Appendix F.

The levee alternatives have adequate clearance to provide a 15' vegetation free zone on both the protected and flood sides and will thus be in compliance with current guidance and policy. Levee designs will include tree removal, sloping, grading, placing fill, etc., necessary to achieve a maintainable 15-foot vegetation free zone from the toe of the levee on both the flood and protected sides. All plans and specifications (P&S) for HSDRRS levee contracts will ensure standards are met with respect to maintenance corridors.

Alternatives 1, 2, and 3 will require additional USACE ROW and servitudes along the Algiers Canal. Alternatives 4 and 5 will require additional DOTD ROW and servitudes along Engineers Road and WPA Road. Alternatives 6 and 7 will be able to be constructed within existing USACE ROW along the canal; however, Alternative 6 will require additional servitudes during construction. Refer to Section 3.3 and the ROW plates in Appendix F for existing and additional ROW requirements. Table 6-1 below shows the total permanent ROW and servitude areas required for each alternative.

Table 6-1
Right-of-way / Easement Requirements

RIGHT-OF-WAY/EASEMENTS REQUIREMENTS (ACRES)					
Alternative	Perpetual Underground Piling Easement	Perpetual Flood Protection Easement or Required Road ROW, as applicable	Temporary Work Area Easement	Access Road Servitude	Staging Area / Trailer Location
1	N/A	17.5	33.9	20.4	0.61
2	N/A	17.5	33.9	20.4	0.61
3	N/A	156.6	27.3	10.6	0.61
4	78.0	38.7	29.3	0	0.61
5	78.0	56.7	29.5	0	0.61
6	0	0	27.6	23.4	0.61
7	N/A	0	0	25.9	0.61

NOTES:
Temporary Work Area Easement includes area needed for clearing and grubbing, and fertilizing, seeding, and mulching.

All alternatives will affect property owners and their operations to some degree during construction. Several will have lasting implications to the owners due to the design requirements. Those effects are discussed below.

Alternatives 1 and 2 both have similar footprints and effects on property owners. Although the number of buildings to be relocated is relatively low when compared to Alternative 3, Alternatives 1 and 2 reduce the amount of work space that the owners currently have in production yards. Many owners currently perform work activities within the USACE's right-of-way. Due to the necessary acquisition of additional right-of-way for the levee and the large areas needed to construct the higher access ramps, many owners lose valuable space to perform work activities. This may impact their ability to sustain their businesses at their respective locations.

Alternative 3 extends the current levee footprint substantially and will have an effect on every property owner along the canal. This new right-of-way would require the acquisition of more than half of the properties' working area and would require relocation of a significant number of buildings and structures. This alternative would force many businesses to relocate due to limited space to perform operations.

Alternatives 4 and 5 will have large impacts on the businesses that have offices and work space along Engineers Road. Although levee access is not as limited as previous alternatives discussed, the owners will lose work space, and will also be left out of the protection system (i.e., between the existing levee at 10.0' and the floodwall at Engineers Road at 14.0'). Alternative 5 will require more right-of-way than Alternative 4 due to the internal access road. Many

buildings and structures will be affected by both alternatives.

Of the alternatives that offer 2057 protection, Alternative 6 offers the least long term impact to property owners despite its high cost, but will have a large impact on owners during construction due to the design requirements. Each property will require floodwall along the existing levee and a gate be constructed for canal access.

Alternative 7 only impacts those business owners who have justified a need for a gate for levee access. The remainder of properties who need levee access will already have a ramp constructed during the current levee lift to 10.0'.

SECTION 7 – RELOCATIONS

7.1 Alternatives 1, 2, 3, 6

These alternatives consist of levee/floodwall/gate alignments near the existing levee alignment, and will affect those utilities identified in previous design efforts and shown on the ROW drawings. Specifically, these alternatives will affect:

- Plaquemines Parish sewer and drainage force mains crossing existing levee at approximate stations 980+00 and 983+00, respectively.
- Bellsouth underground communications line that crosses levee at station 1150+40.
- Various Entergy overhead lines crossing levee to provide flood side work areas for property owners.
- Individual property owners who have run utilities across levee (various locations – see ROW drawings).

The major utility lines crossing the levee (Plaquemines Parish, Bellsouth, and Entergy lines) cost between $100,000 and $1,000,000 apiece, depending on the complexity of the relocation and materials needed. Entergy will also need to raise site-specific lines crossing the levee for clearance at all current locations (approximately 15). In addition to the major utility lines, property owners will be required to relocate their private utilities (air lines, site water, site power, etc.), which adds another significant cost to the relocations.

Table 7-1 presents the anticipated relocations costs for Alternatives 1, 2, 3, and 6. The unit costs used in the table are based on vendor quotations and/or previous study in the project area (*Preparation of Design Alternative Study for the Westbank and Vicinity Hurricane Protection Project, GIWW Navigable Closure Structure Alternatives*). This estimate does not include costs to remove part of all of affected buildings due to the variety of type and value along this reach.

Table 7-1
Anticipated Relocations Costs – Alternatives 1, 2, 3, and 6

Item	Number of Locations	Unit Cost	Total Cost
Plaq. Parish Sewer	1	$250,000.00	$250,000.00
Plaq. Parish Drainage	1	$250,000.00	$250,000.00
Bellsouth	1	$250,000.00	$250,000.00
Entergy	15	$100,000.00	$1,500,000.00
Individual Property Owners *	4	$100,000.00	$400,000.00
TOTAL			**$2,650,000.00**
*Note: These owners are assumed to be C&C Marine, C&C Boatworks, Universal Services, and Sunland Construction.			

7.2 Alternatives 4, 5

These alternatives consist of floodwalls along Engineers Road, and then running across vacant land to WPA Road, and then to the end point of the project reach (see plates). The specific utilities affected include:

- Plaquemines Parish water tower on Engineers Road near the intersection with Belle Chasse Highway.
- Plaquemines Parish water line and hydrants along Engineers Road and WPA Road.
- Bellsouth underground communications line that crosses levee at station 1150+40.
- Various Entergy overhead lines running parallel to Engineers Road and WPA Road.
- Individual property owner's drainage culverts along Engineers Road and WPA Road.
- Pond in the vicinity of Alsem Inc. that is along proposed floodwall alignment.

The major utility line crossing the levee (Bellsouth and Entergy lines) cost between $100,000 and $1,000,000 apiece, depending on the complexity of the relocation and materials needed. Entergy will also need to raise site-specific lines crossing the levee for clearance at all current locations (approximately 15). These alternatives require relocation of utilities along the roadways, including water and gas lines, and power poles. Drainage culverts will be left in place to receive flows through drainage monoliths placed in the floodwalls. In addition to the major utility lines, property owners will be required to relocate their private utilities (service lines for water and gas, etc.), which adds another significant cost to the relocations.

Table 7-2 presents the anticipated relocations costs for Alternatives 4 and 5. The unit costs used in the table are based on vendor quotations and/or previous study in the project area (*Preparation of Design Alternative Study for the Westbank and Vicinity Hurricane Protection Project, GIWW Navigable Closure Structure Alternatives*). This estimate does not include costs to remove part of all of affected buildings due to the variety of type and value along this reach.

Table 7-2
Anticipated Relocations Costs – Alternatives 4 and 5

Item	Number of Locations/Quantity	Unit Cost	Total Cost
Plaq. Parish Water Tower Modifications	1	$500,000.00	$500,000.00
Bellsouth	1	$250,000.00	$250,000.00
Entergy	15	$100,000.00	$1,500,000.00
Plaq. Parish Water Line along Roadway	25,000 ft	$100 per linear foot	$2,500,000.00
Plaq. Parish Hydrants	65	$3,000 per hydrant	$195,000.00
Water/Gas Service Lines	Approximately 60 connections (200' of pipe per connection)	$5.00 per foot of pipe	$60,000.00
Alsem Pond (400' by 400' by 4' deep)	Fill in 24,000 CY	$30/CY	$720,000.00
TOTAL			**$5,725,000.00**

SECTION 8 – COST ENGINEERING

8.1 Cost Estimate for Each Alternative

Preliminary cost estimates and construction durations were calculated for each alternative, as shown in Table 8-1.

Table 8-1
Alternative Comparison Matrix

Alt.	Cost	Time for Construction Completion (assumes 5 contracts over reach)		Additional Perpetual Flood Protection Easement (acres)
		Phase 1 Pre-Katrina Authorized	100-year	
1	Initial $ 105.2M Req'd Lifts $12.2M*	N/A	2 years (1 crew per contract)	17.5
2	Initial $ 173.6M Req'd Lift $6.1M**	N/A	2.8 years (1 crew per contract)	17.5
3	Initial $ 144.8M Req'd Lifts $31.4M***	N/A	2.8 years (2 crews per contract for earthwork)	156.6
4	$ 341.7M	N/A	2.8 years (1 crew per contract)	38.7
5	$ 334.1M	N/A	2.5 years (1 crew per contract)	56.7
6	$ 280.9M	N/A	2.8 years (1 crew per contract)	0
7	$ 39.9M	1.3 years (1 crew per contract)	N/A	0

*It is estimated that Alternative 1 will require two additional lifts due to settlement within the first year after the initial raising of the levee. Each lift will cost $6.1M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

** It is estimated that Alternative 2 will require one additional lift due to settlement within two years of the initial raising of the levee. This lift will cost $6.1M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

*** It is estimated that Alternative 3 will require two additional lifts due to settlement within 2.5 years of the initial raising of the levee. Each lift will cost $15.7M, including mobilization, clearing and grubbing, embankment, fertilizing and seeding, and crushed stone.

There is a sizable difference in estimated costs among the alternatives, with total costs ranging

from $40M to over $342M. Refer to Appendix A for the cost estimate calculations and Appendix B for the construction duration charts. It should also be noted that due to the down drag load discussed in Section 5.4.6 that Alternative 6 could have additional pile costs as much as $50M that are not currently included in the cost for that alternative.

Preliminary operations and maintenance (O&M) cost estimates were calculated for each alternative, as shown in Table 8-2. These costs were based on the USACE-provided assumptions that levees cost $9,000 per mile of levee per year to maintain, and that gates cost $700 per gate per year to maintain.

Table 8-2
Alternative Operations and Maintenance Matrix

Alternative	Number of Gates	Miles of Levee	Total Annual O&M Cost
1	16	Approximately 4.8	$54,400.00
2	16	Approximately 4.8	$54,400.00
3	16	Approximately 4.8	$54,400.00
4	48	N/A	$33,600.00
5	10	N/A	$7,000.00
6	44	Approximately 4.8	$74,000.00
7	44	Approximately 4.8	$74,000.00

8.2 Estimate for Selected Alternative (PPD)

Although Alternatives 1 and 7 are preferred, depending upon the implementation of the 2057 protection south of the reach, one alternative has not been selected as of this 95% feasibility-level submittal. Costs for all seven alternatives are presented above.

8.3 Level of Contingencies Incorporated into Estimates

Per the USACE's 65% comments, a 25% contingency was included in the total cost estimates for each alternative.

SECTION 9 – QUALITY IMPLEMENTATION

9.1 Quality Control Plan

Westbank and Vicinity, Hurricane Protection Project
Preparation of an Engineering Alternative Report
Belle Chasse Highway to Hero Cutoff Levee, Floodwalls and Floodgates
Algiers Canal Industrial Reach, Phase 2

DESIGN QUALITY CONTROL PLAN

1. Project Information:

a. **Project name:** Westbank and Vicinity, Hurricane Protection Project, Preparation of an Engineering Alternative Report, Belle Chasse Highway to Hero Cutoff Levee, Floodwalls and Floodgates, Algiers Canal Industrial Reach, Phase 2

b. **Project location:** Algiers Canal from Belle Chasse Highway to Hero Cutoff (Plaquemines Parish, LA)

c. **Project description:** The project as covered by this Contract shall consist of reparing an Engineering Alternative Report that will describe alternatives for providing the 100-year level of protection, inclusive of earthen levees, floodgates and floodwalls.

d. **Project work:** Please refer to **Attachment 1** for the Scope of Work. The design calculations for all design features (slope stability, concrete floodwall, steel swing gate, site work, foundation design, etc) will be completed by the appropriate team members listed in the PDT using the technical criteria listed in Paragraph 6. An A-E ITR team will review and provide feedback on all of the design calculations, plans and specifications prior to advertisement. A USACE technical review will be completed by the team members listed in the USACE technical review paragraph. The deliverables will include an Engineering Alternative Report, Independent Technical Review, proper design documentation, and Final Design Calculations.

A copy of the Project Management Plan can be found at:
https://mvn-fshpo01.mvn.ds.usace.army.mil/HPSDocs/PDT/PROPDT/Floodwalls/PMP

The project does not require a Value Engineering Study.

2. Purpose and Scope of DQCP:

- Purpose – This DQCP outlines the professional expertise, technical criteria, and technical review processes that will be used to produce a quality product satisfying technical, functional, legal, safety and environmental requirements.

- Scope – The scope of this quality control effort is to enhance the synergy between the Product Delivery Team (PDT) and the Independent Technical Review Team (ITR) in order for these two entities to work hand-in-hand to submit a design product that not only meets and exceeds the Scope of Work requirements, but also does so within the very restrictive schedule constraints. An ITR is essential more than ever to ensure correct design procedures are followed in the very limited time allowed to submit a final design product suitable for construction.

  - Consequences of a Failure: Failure of any one of the features of work being designed for this project can result in catastrophic failure causing the uncontrolled release of hurricane storm surge on the protected area in the sub-basin.

  - Nature of Work (routine or non-routine): The work being performed for these projects is non-routine due to the heavily industrial nature of the new floodwall/gate alignment. (i.e. large presence of fabrication shops and dry dock facilities, proximity to Engineers Road)

  - Risks Inherent in the Project: Due to the heavily industrial nature of the project area, there is substantial risk that there may be buried obstructions and or unidentified utilities in the area not found during the survey. Also due to the industrial nature of the area, there may be unidentified environmental issues.

  - Special Considerations:

    - Report must address major utilities only.
    - Existing site drainage must be maintained/accommodated.

  - Crucial Design Features:
    - T-wall Type Floodwalls: Monoliths, foundations, cutoff sheeting.
    - Drainage Type T-wall Floodwalls: Monoliths, foundations, cutoff sheeting
    - Floodgates: Gates, monoliths, foundations, cutoff sheeting.
    - Geotechnical designs (soil mixing and geotextile-reinforcements)

3. Deliverables:

- Design Quality Control Plan (DQCP)
- Engineering Alternative Report (EAR)

- Right-of-Way Plates
- Design Calculations
- Quantity and Cost Estimates

Submittals will be provided according to the schedule in Section 11 and in the quantities as defined in the Scope of Work.

4. Customer Involvement:

- The USACE New Orleans District has undertaken the important task of obtaining the input and feedback from concerned local governing authorities, residents, utility companies, and other stakeholders in the development of these vital projects. URS Corporation will assist the USACE as instructed and as needed with regards to customer involvement as the New Orleans District takes the lead in integrating customer needs into the final design product.

  This involvement includes formal meetings and presentations, formal reviews, informal meetings and discussions, teleconferences, e-mails and telephone conversations. Customer involvement at all levels is vital to instill confidence that the customers' needs are being addressed and that the project design and construction efforts are of high quality. The following are points of contact for the local sponsors and other agencies:

  The following are points of contact for the local sponsors and other agencies:

  West Jefferson Levee District
  7001 River Road
  Marrero, Louisiana 70072
  Gerald Spohrer (Executive Director)
  P: 504-340-0318

  Louisiana Department of Transportation & Development
  Public Works and Hurricane Flood Protection
  8900 Jimmy Wedell
  Baton Rouge, LA 70807
  Bill Feazel, P.E., P.L.S.
  Director, Federal Programs
  williamfeazel@ldotd.la.gov

  Southeast Louisiana Flood Protection Authority – West
  7001 River Road
  Marrero, Louisiana 70072
  David Bindewald
  Regional Director
  P: 504-340-0318

Jefferson Parish Department of Drainage & Pump Stations
1221 Elmwood Pk. Blvd., Suite 907
Jefferson, LA 70123
Kazem Alikhani (Director) or Ali Pirsalehy (Asst. Director)
P: 504-736-6730 P: 504-736-6730
KAlikhani@jeffparish.net Apirsalehy@jeffparish.net

As needed, additional points of contact will be verified and the DQCP will be updated to include other customers.

5. Metric System:

- Reference: CECW-CE, Engineering and Construction Bulletin, No. 2004-13, Issued 30 Aug 2004. This guidance states that the metric system shall be used unless such use leads to inefficiencies or is otherwise impracticable.
- The existing hurricane protection project was designed and constructed using the inch-pound system of measurement. It is not practicable to switch to the metric system for the remaining design and construction due to inherent inefficiencies. This ongoing design work and all supporting features of the design will use the Standard English foot/inch/pound units system of measurement.

6. Technical Criteria:

a. The project is being designed in accordance with Corps of Engineers criteria contained in engineering regulations, manuals and ETLs, including the following:

- ER 1110-1-12, Quality Management, dated 21 July 1996
- EM 1110-2-2502, Retaining and Flood Walls, dated 29 Sep 89
- EM 1110-2-2906, Design of Pile Foundations, dated 15 Jan 91
- EM 1110-2-2000, Standard Practice for Concrete for Civil Works Structures, Change 2, dated 31 Mar 01
- EM 1110-2-2105, Design of Hydraulic Steel Structures, Change 1, dated 31 May 94
- EM 1110-2-2102, Waterstops and Other Preformed Joint Materials for Civil Works Structures, dated Sep 95
- EM 1110-2-2104, Strength Design for Reinforced Concrete Hydraulic Structures, dated Jan 92
- EM 1110-2-322, Retaining and Flood Walls, dated Oct 90
- Hurricane and Storm Reduction System Design Guidelines, dated 23 Oct 07
- http://www.mvn.usace.army.mil/ED/edsp/MVN-ED_HSDRS_Design_Guidelines_2007-10.pdf
- American Concrete Institute (ACI), Building Code Requirements for Structural Concrete (ACI 318)
- American Institute of Steel Construction (AISC), Allowable Stress Design Manual of Steel Construction

b. Technical information, parameters, and designs are being incorporated into the design products and technical documentation. The design approach and any special considerations will be documented in the technical design calculations. Any additional required criteria will be added to the DQCP as it is updated.

7. Vertical Datums:

The establishment and use of vertical datums in the design work will follow the guidance provided in CECW-CE, INTERIM GUIDANCE FOR A PRELIMINARY EVALUATION OF VERTICAL DATUMS ON FLOOD CONTROL, SHORE PROTECTION, HURRICANE PROTECTION, AND NAVIGATION PROJECTS, dated 31 October 2006. Information relating to the location and determination of elevations of all vertical datums used in the project design will be provided, in the form of a Survey Documentation Report, for review and validation. When competed, the Survey Documentation Report will be included as an attachment to the DQCP (attachment 4).

a. All surveys shall be conducted in accordance with CEMVN-ED-SS-06-01, "USACE New Orleans District Guide for Minimum Survey Standards for Performing Hydrographic, Topographic, and Geodetic Surveys". The guidance is available at http://www.mvn.usace.army.mil/ed/edss/surveyingguidelines.asp

b. A Survey Report Summary will be completed by Engineering Division, Survey Section for Independent Technical Review (ITR) within two weeks of completing the surveying activities and office processing.

c. Minimum survey deliverables shall include: Survey Report Summary, PDF file of all field books and logs, ASCII coordinate file containing pertinent metadata records, and Benchmark Description Forms.

d. Hurricane protection projects shall be referenced to both NAVD88 and Local Mean Sea Level (LMSL). Where the relationship between NAVD88 and the LMSL does not exist, a tidal study is necessary to establish the local sea level datum.

e. All geospatial data shall contain metadata which defines the relationship between NAVD88 and the local tidal datum (LMSL, MLLW, etc) using the latest epochs.

f. All projects shall reference a minimum of three Permanent Bench Marks (PBM). Ideally these PBMs shall be located in the middle and at each end of the project. All surveys shall tie into a minimum of 3 benchmarks to determine the reliability of the project's control. The 3 permanent bench marks will be listed on the QA Final Review check list and verified by USACE's Survey Section.

g. GPS static networks shall follow the NGS Publication 58 guidelines for establishing vertical control. All RTK surveying shall be supported with documented Q/C ties to existing project control.

8. Product Delivery Team (PDT):

The PDT is a multi-disciplined team with the responsibility to keep project work integrated and done in accordance with the approved business and quality management processes; ensure the customer's quality objectives are clearly articulated; convey to the customer the essential professional standards, laws and codes which must be incorporated into the work; meet the commitments for completion of their portion of the work; and monitor and be accountable for the quality of their work. The PDT will be led by an experienced leader who has designed or led past PDTs in the successful completion of similar work. Other members have extensive professional experience in their assigned responsibilities. The team is well-balanced, but should future project requirements surface which require different skills and experience, those personnel will be added. All existing information will be reviewed by the PDT to determine future field investigations. The Project Manager (PM) is the primary person within the PDT to ensure all referenced Quality Management policies and procedures stipulated in this DQCP are being initiated, performed and completed satisfactorily in accordance with ER 1110-1-12, Quality Management. The following personnel have been designated as the PDT design technical staff for this project. The years of experience shown represent the total number of years of experience that the individual has in his or her listed field.

Client – USACE, New Orleans District

Name	Discipline	Professional Registration	Role/Responsibility	Years of Experience in Field
Barry Fehl	Civil/Structural Engineer	P.E. #33185 (LA), Civil Engineering	Project Principal	28
Roy Thomas	Civil Engineer	P.E. #29936 (LA), Civil Engineering	Project Manager/Team Leader	10
Frank Lawler	Structural Engineer	P.E. #70766 (TX), Civil Engineering	Project Engineer/Structural Design	21
Katrinna Durbin	Structural Engineer	P.E. #32504 (LA), Civil Engineering	Project Engineer/Structural Design	6
Naveen Chillara	Civil Engineer	P.E. #32557 (LA), Civil Engineering	Project Engineer/Civil Design	6
Edward Doepp	Civil Engineer	E.I., Civil Engineering	Project Engineer/Civil Design	7
Larry Nobles	Geotechnical Engineer	P.E., Civil Engineering	Project Engineer/Geotechnical Design	30+
Richard Bird	Geotechnical Engineer	P.E., Civil Engineering	Project Engineer/Geotechnical Design	40+
Silas Cunningham	CADD/Tech.	N/A	CADD Tech.	14

Survey Work will be done by Shread-Kuyrkendall and Associates.

Roy Thomas will be in responsible charge of the daily civil design and CADD supervision activities. Frank Lawler will be in responsible charge of the daily structural design and CADD Supervision activities. Roy Thomas will be the professional in responsible charge of the design work. He will be the official point of contact for communication between the USACE and the URS Corporation. Barry Fehl will serve as Mr. Thomas's alternate point of contact.

Technical Review Procedures

The review procedures for this project will be conducted in accordance with this Design Quality Control Plan (DQCP) and procedures delineated in the Project Management Plan prepared to be specific for this work. DQCP procedures follow the URS Corporation Quality Assurance Program guidelines and incorporate the applicable sections into this work. The URS Quality Assurance Program is recognized as being compliant with ISO 9001.

The reviews for this Project will be conducted and documented on appropriate forms and signed by the reviewers and Project Team Leader. Reviews will consist of calculation checks, both design and quantity calculations, detailed checking and Independent Technical Reviews of the work products.

Calculation checks will consist of detailed checks of engineering design calculations and quantities for the Cost Estimate. All calculation sheets will be properly noted by heading, project identification, calculation description, name of preparer, date of calculation, name of reviewer (signed) and date of review. Calculations will be checked for correctness of calculation, and computer calculations will checked for input, output and reasonableness of results. Deficiencies will be discussed with the originator of the calculation and resolved. A cover sheet will be prepared presenting the information from the review and attached to the calculation(s). The sheet will be signed and dated and approved by the Project Team Leader.

The review will be performed by experienced professional engineers in the disciplines of work involved and who may be a member of the Team but did not participate in the preparation of the document(s) reviewed. The comments will be contained on the work products or given on the Detail-Checking Comments sheet. The comments will be resolved between the originator of the documents with the response noted and the reviewer.

An Independent Technical Review (ITR) will be conducted by Dan Marsalone, Christine Darrah, and Charles Cammack who will not be involved in the preparation of the documents and have senior level experience. The ITR Report form will be filled out showing the conduct of the review and the products reviewed. The ITR will review and evaluate the conceptual designs, material requiring interpretation, and verify and validate assumptions, methodologies, and conclusions. It will also verify that the completed work meets the contractual requirements. Comments will be presented on the sheet entitled Independent Technical Review Comments with the response noted and differences discussed and resolved with the originator of the documents. The Project Team Leader has oversight for the review and will acknowledge that the review was completed and comments resolved by signing-off on the Independent Technical Review Report.

9. Independent Technical Review (ITR):

- The ITR will follow the guidance and requirements of Appendix B of the HPS QAP and ER 1110-1-12. The ITR will be a continual process with the team members kept aware

and included in scheduled project briefings and site visits. The ITR member shall not be part of the immediate design team and shall have a minimum of 10 years of experience in the appropriate field with the appropriate Professional Registration. The ITR shall review the DQCP, 65% and 95% EAR submittals; the calculations, and soils report. The ITR team shall concentrate on technical accuracy, soundness of engineering judgment, constructability, and operability. The design engineer shall resolve all ITR comments and return resolution to both the ITR team and the Technical Manager for their concurrence. The team will consist of the following members:

Name	Discipline	Professional Registration	Role/Responsibility	Years of Experience in Field
Dan Marsalone	Civil Engineer	P.E. #7487 (LA), Civil Engineering	ITR Team Lead	40+
Dan Marsalone	Civil Engineer	P.E. #7487 (LA), Civil Engineering	Structural Design ITR	40+
Christine Darrah	Civil Engineer	P.E. #28528 (LA), Civil Engineering	Civil Design ITR	12
Charles Cammack	Geotechnical Engineer	P.E. #12020 (KS), Civil Engineering	Geotechnical Design ITR	30

- Review will be continuous throughout the design process. Review comments and resolutions must be entered into DrChecks, ref. ER 1110-1-8159, Engineering and Design—DrChecks, 10 May 2001.
- Documentation will be provided for all ITRs, consisting of a completed (signed) statement of technical review and certification (ref. ER 1110-1-12), to which is attached all review comments (identified by the Reviewer) and the response of the designer to the comment. Documentation will be submitted concurrently with the final design product.

10. Biddability, Constructability, Operability, and Environmental (BCOE) Review:

A USACE Technical review will be conducted, utilizing appropriate technical expertise and resources. The USACE technical reviews are coordinated reviews by a qualified team to improve how well the alternatives presented in the Engineering Alternative Report (EAR) can be understood, to assure that the report adequately addresses the construction costs and durations, real estate requirements and associated costs/cultural consequences, constructability of the alternatives presented, operations and maintenance costs associated with the alternatives presented, and any relocations required in conjunction with any specific alternative. This type of review shall occur at both the 65% and the 95% EAR submittal and shall include the Review Team listed below, local sponsors and agencies. The review team

shall comment on the 65% and 95% EAR utilizing DrChecks, comments shall be evaluated by the design engineer and returned to the review team for concurrence. The review shall include input from local sponsors listed above to assure customer involvement in all major decisions. These reviews will be joint MVN and PRO office efforts to serve as the processes that assure the basic product (EAR) submitted meets the intent of Hurricane Protection Project requirements. All reviews will be documented electronically utilizing Dr. Checks.

The USACE technical reviews will follow the guidance and requirements of section 5 of the HPS QAP and ER 415-1-1. The designers will resolve all comments from the review. The anticipated reviewers include the following:

Name	Discipline (Yrs. Exp. In Discipline)	Office	Registration
Chris Dunn	Structural (9)	ED-T	P.E., LA
David Lovett	Structural (5)	ED-T	P.E.,LA
Tim Connell	Project Manager	PM	
Leeland Richard	Geotechnical (4)	ED-F	E.I., LA
Patrick Shepherd	Civil (5)	ED-L	P.E., LA
Darrell Normand	Civil/Cost	ED-SC	
Henry Phillips	Mechanical (1)	ED-T	
Jabeen Pasha	Electrical (8)	ED-T	E.I., LA
Douglas Ferrell	Civil (1)	ED-SR	
Heath Jones	Civil/Hydraulics (10)	ED-H	E.I., LA
Mark Huber	Surveys (25)	ED-SS	ASCM Cert Surveyor
Gib Owen	Cultural Resources/Historical Environmental Compliance (21)	PM-RS	
Robert Thomson	Real Estate (8)	RE-L	
Steve Schinetsky	Civil (25)	OD	P.E., LA
Jim Montegut	Civil/Construction (35)	CD	

11. Schedule / Checklist

Please refer to the following estimated Project Milestone Schedule:

CONTRACT AWARD	**JANUARY 16, 2008**
DQCP SUBMITTAL & BM DESCRIPTION FORMS	**7 CALENDAR DAYS AFTER CONTRACT AWARD – JANUARY 23, 2008**
60% SUBMITTAL (ROW PLATES)	**77 CALENDAR DAYS AFTER CONTRACT AWARD – APRIL 2, 2008**
65% SUBMITTAL (Eng. Alt. Rept.)	**88 CALENDAR DAYS AFTER CONTACT AWARD – APRIL 13, 2008**
65% REVIEW	**98 CALENDAR DAYS AFTER CONTRACT AWARD – APRIL 23, 2008**
65% COMMENT RESOLUTION	**105 CALENDAR DAYS AFTER CONTRACT AWARD – APRIL 30, 2008**
95% SUBMITTAL and ITR SUBMITTAL	**133 CALENDAR DAYS AFTER CONTRACT AWARD – MAY 28, 2008**
95% REVIEW	**147 CALENDAR DAYS AFTER CONTRACT AWARD – JUNE 11, 2008**

95% COMMENT RESOLUTION	**154 CALENDAR DAYS AFTER** **CONTRACT AWARD – JUNE 18, 2008**
100% SUBMITTAL	**168 CALENDAR DAYS AFTER** **CONTRACT AWARD – JULY 2, 2008**

12. Record Maintenance

Documentation will follow the requirements of section 4.3 of the HPS QAP. QC Documents as follows will be maintained by the Project Manager and stored by MVN's Engineering Control Branch in Engineering Division. POC for Engineering Control is Mike Dupuy, (504) 862-2612.

The following QC documentation will be provided, in both hard copy and electronic format, to the PRO:

- The initial Design Quality Control Plan (within 7 days of commencing design) and any changes during the design process.
- ITR review comments, resolution of comments, and statement of technical review and certification (concurrent with final submittal of design product).
- Resolution of review comments.
- Technical documentation (e.g. calculations) as required.

All reviewed and accepted documents and other project-related materials shall be provided in electronic form for filing in the ProjectWise database by MVN for purposes of review during project development and delivery and in order to compile the Design Documentation Report (DDR) which will compile all project information for future reference and retrieval.

13. Signatures

A signed Plan by the URS ITR Leader, by the URS Project Manager, and by the PDT Project Principal will be provided as an attachment to the ITR/Technical Review documentation upon completion of the Technical Review. This document is included as **Attachment 2.**

9.2 Independent Technical Review

Independent technical review is being performed continuously in accordance with the Design Quality Control Plan.

9.3 Review Technical Review Comments and Provide Resolution

The comments and resolutions from the 65% submittal are provided below.

Comment Report: All Comments
Project: WBV-6a.2 Algiers Industrial Reach
Review: 65% EAR Review
Displaying 102 comments for the criteria specified in this report.
2985 ms to run this page

Id	Discipline	DocType	Section/Figure	Page Number	Line Number
1868121	Environmental	Technical Report	n/a'	n/a	n/a
Status of National Environmental Policy Act (NEPA) Compliance: The subject work will be covered in the individual environmental report (IER) #12entitled "Harvey and Algiers Canal Levee and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes", which is scheduled to be completed 03 July 2008. In addition, the comprehensive environmental document (CED) will have been prepared and include the subject work from IER #12. The subject work is not currently compliance with NEPA. Submitted By: Getrisc Coulson (504-862-1095). Submitted On: 11-Apr-08 Revised 29-Apr-08.					
1-0	Evaluation **Concurred** This information has been noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Getrisc Coulson (504-862-1095) Submitted On: 19-May-08				
1-2	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Getrisc Coulson (504-862-1095) Submitted On: 21-May-08				
1-3	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Getrisc Coulson (504-862-1095) Submitted On: 23-May-08				
	Current Comment Status: **Comment Closed**				
1869358	Real Estate	Other	n/a'	n/a	n/a
Real Estate Division has no comments at this time.					

Submitted By: Louis Cheek (504-862-1563). Submitted On: 11-Apr-08	
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed Submitted By: Louis Cheek (504-862-1563) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1875347	Utilities Engineering	Plans	n/a'	n/a	n/a

Coordinating Discipline(s): Utilities Engineering

All of the alternatives for this EAR except # 4and 5 will be impacted by facilities already identified for the authorized lift currently under construction. The facilities that will impact alternative # 4 and 5 will be verified before the 95% EAR is completed. Relocation Section will coordinate with Real Estate Division to verify responsibility of the facilities impacted by these two alternatives. There is no cost data to verify at this time and Relocation Section will review cost data when available.

Submitted By: Gregory DeBose (504-862-2452). Submitted On: 16-Apr-08

1-0	Evaluation **Concurred** Estimated relocations costs will be provided for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Gregory DeBose (504-862-2452) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1888906	Civil	N/a	Alternative 1 - Typical Section for Levee	C-01	n/a

1. The typical section for the levee should show the existing landside levee R/W. 2. Degrading the existing levee to the 1V on 5H slope on the floodside to -1.0 will guarantee that water will be on the 1 on 5 slope 100% of the time. Why not leave the existing levee in place? 3. Elevation 6.0 seems high to install the reinforcing geotextile.

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08

1-0	Evaluation **For Information Only** Concur to note 1. Note 2, we evaluated the case of not degrading levee and the existing levee needs to be degraded for anchorage length. Submitted By: Roy Thomas (504-837-6326) Submitted On: 22-May-08
1-1	Backcheck Recommendation **Close Comment** concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1888923	Civil	N/a	Alternative 1 - Gate Monolith	C-01	n/a

1. Show the existing landside levee R/W. 2. The 1V on 10H degrading on the floodside should intersect the average elevation of the ground between the existing levee and the existing top of bank. The way it's designed as shown the facility owners have no room on the floodside for their operations in the future. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08	
1-0	Evaluation **Concurred** Concur with comments. During 65% review meeting, it was discussed that the (-)1' elevation was used for water's edge. The cross-section used was for a worst case situation (shortest distance from levee centerline to water's edge). For most sites, the ramps and levee would intersect with existing ground, which is generally higher (+2' to +4'). Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1888928	Civil	N/a	Alternative 2 Typical Sections for Levee and gate	C-02	n/a

Same comments as made on Sheet C-01. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08	
1-0	Evaluation **Concurred** Same responses, as same rationale for water's edge was used. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1888943	Civil	N/a	Typical Sections	C-03	n/a

1. Show the existing landside levee R/W on both Typ. Secs. 2.Why is the 1V on 10H slope needed from elevation 5.5 and 5.0 to elevation -1.0, respectively, on the floodside? Degrading the existing levee below the elevation of the existing ground between the floodside levee toe and the top of bank renders this land useless to the facility owners. 3. Add a "1" in front of the "5.33" on the Gate Monolith Typ. Sec. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08	
1-0	Evaluation **Concurred** Concur with notes 1 and 3. Note 2 refers to the "worst case" that is shown on the sections. In most cases, the levee and/or ramps will intersect with existing grade on the floodside at elevation +2' to +4' as opposed to the (-)1' shown as water's edge (i.e., no degrading for most cases). This would still keep land available for the facility owners. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08

	Current Comment Status: **Comment Closed**

1888966	Civil	N/a	Typical Sections	C-04 and 05	n/a

Use a break line and show the approx. distance from the existing landside levee R/W to the floodside edge of the new required permanent R/W.

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08

1-0	Evaluation **Concurred** We can show a break line with distance labeled as "varies". The wall is parallel to Engineers Road for a distance, then turns toward the levee to avoid the future Peters Road extension project, as recommended by project management. Therefore, distance between wall and levee changes dramatically depending on location. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1888987	Civil	N/a	Typical Sections	C-06 and 07	n/a

1. The elevation of the existing ground between the floodside levee toe and the top of bank is around 4.0. Where is the -1.0 coming from? URS has all the surveys for the job they designed that is presently being constructed. 2. Typ. Sect. on C-07. The ramp for the crane will require a bulkhead be constructed at the top of canal bank with the top elevation of the bulkhead at the elevation of the existing ground, not -1.0.

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08

1-0	Evaluation **Concurred** The -1.0' elevation was meant to represent water's edge in a worst-case scenario. In most cases, the ramp and/or levee would slope down to existing grade at +2.0' to +4.0'. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1889030	Construction Phasing	N/a	n/a'	C-08 Thru C-67	n/a

All plan views must show the existing landside levee R/W. URS has this information as part of their P&S for WBV-6a.1.

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08

	Current Comment Status: **Comment Closed**				
1889031	Civil	N/a	n/a'	C-68	n/a
What is the need for a stage hydrograph? Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08					
1-0	Evaluation **Concurred** For reference when evaluating construction methods to place sills for gates, soil mixing, levee degradation, etc. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08				
	Current Comment Status: **Comment Closed**				
1889050	Civil	N/a	n/a'	C-01 thru C-07	n/a
The typical sections for all the alternatives must show the limits of Fertilizing, Seeding and Mulching. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 29-Apr-08					
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 06-Jun-08				
	Current Comment Status: **Comment Closed**				
1892789	Hydraulics	N/a	n/a'	ES-1	1st Paragraph
The 2057 minimum hydraulic levee elevation is 14.0 ft. The AE uses the terminology "flood elevation". 14.0ft is not the flood elevation. Submitted By: Keely Crowder (504-862-2114). Submitted On: 01-May-08					
1-0	Evaluation **Concurred** The correct terminology will be used in the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** OK Submitted By: Keely Crowder (504-862-2114) Submitted On: 03-Jun-08				
	Current Comment Status: **Comment Closed**				
1892800	Hydraulics	N/a	n/a'	ES-1	General comment
Similar to the previous comment, "flood elevation" is not correct. It is either a floodwall elevation or a levee elevation. Throughout the report, the AE needs to clarify when they are refering to: -Phase 1 Pre-Katrina (3rd Supplement) authorized levels of protection -Phase 2, 100-yr 2011 (4th Supplement) authorized levels of protection -Phase 2, 100-yr 2057 (4th					

Supplement) authorized levels of protection Simply using the term "authorized" is unclear Submitted By: Keely Crowder (504-862-2114). Submitted On: 01-May-08	
1-0	Evaluation **Concurred** Correct terminology will be used in the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** OK Submitted By: Keely Crowder (504-862-2114) Submitted On: 03-Jun-08
	Current Comment Status: **Comment Closed**

1892867	Hydraulics	N/a	5.3 Design Elevation - Hydraulic Design Criteria	15	n/a

The Hydraulic Design Criteria contains incorrect information. The 2007 100-yr minimum required hydraulic levee elevation is 10.5 ft with a 1:4 floodside slope. Structures are only designed for 2057 conditions. The surge elevations should be removed from the report. The 2057 100-yr minumum required hydraulic levee elevation is 14ft with a 1:5 floodside slope. The 2057 100-yr minimum required structure elevation is 13 ft. Structures branch should be contacted regarding the addition of structural superiority to this elevation. The alternatives should reflect the correct design elevations. Submitted By: Keely Crowder (504-862-2114). Submitted On: 01-May-08	
1-0	Evaluation **Concurred** The Hydraulic Design Criteria was taken directly from the scope. During the 65% review conference, it was discussed that removal of any references to "2007 elevation" would help to clarify. Text will be updated to reflect correct design elevations. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 09-Jun-08
	Current Comment Status: **Comment Closed**

1895264	Utilities Engineering	N/a	n/a'	n/a	n/a

The facilities that would impact alternatives 1,2,3,6 and 7 have already been identified for the authorized lift of this levee which is currently under way. Relocation Section conducted a feild visit to verify the facilities that may impact alternatives 4 and 5 and found several facilities that are not documented on the drawings. These facilities are listed below. UTILITIES (Power Poles (pp) & Light Poles (lp)) 1.1 power pole missing between E4 & E5 near D1 needs to be relocated 2.4 power pole and 1 light pole at Versabar near D18 needs to be relocated 3.1 power pole in front of Versabar needs to be relocated 4.1 power line needs to be raised that runs to light pole at the main entrance of Versabar near D21 needs to be relocated 5.2 power poles near fence line of Versabuild and Circle Inc. near D24 needs to be relocated 6.1 power pole on west side of driveway of IntraCoastal Truck & Trailer Service (504) 391-2220 needs to be relocated and 2 light pedestals inside fence of IntraCoastal Truck & Trailer Service need to be relocated 7.2 power poles on west side of Schlumberger drive way needs to be relocated 8.2 power poles on property line between ACE Transportation and NREC near D48 & D49 needs to be relocated 9.1 light pole in General Marine Leasing paved parking lot needs to be relocated 10.1 power pole near ditch approx 200 ft east of drive way to Southern Imports needs to be relocated and 2 power poles approx 20 ft west of drive way to Southern Imports needs to be relocated 11. 2 power poles approx 400 ft east of main entrance of C/C Boat Works plus 2 power poles approx 150 west of C/C Boat Works and 1flag pole at C&C Boat Works needs to be relocated 12.1 power pole along east fence line of Sunland Construction and 2 power poles near center line of yard of Sunland Construction needs to be relocated 13.1 power pole along east & west side of Concord Rd at Engineers Rd (near Angelos Café) needs to be relocated 14.6 power poles west of Concords Rd at Engineers Rd not labeled 1 power pole in front yard of Seatrax that

needs to be relocated 2 power poles on south side of West W Rd b/t water tower & end of Right of Way Of Construction Limits needs to be relocated Fire Plugs and Water Service not Identified. Sheet-R-31, south side of West W Street, near E-2. Sheet-R-37, 200' east of Concord Road, on south side of Engineers Road. Sheet-R-38, W-3 should be W-5. Sheet-R-38, W-4, W-5 and W-6 should be DND. Sheet-R-38, south side of WPA Road at River Construction Driveway, near W-8. Sheet-R-38, W-12 should be a "D" (Culvert under Driveway) Sheet-R-39, W-15 is pointing to wrong place and should point to location between E-78 and E-79 Submitted By: Gregory DeBose (504-862-2452). Submitted On: 03-May-08	
1-0	Evaluation **Concurred** Per 65% review conference, USACE is to provide list of missing utilities. URS was tasked to find "major" utilities, so minor utiliites such as water/gas services will be approximated on drawings. Concur to correct mislabeled utilities/dispositions. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Gregory DeBose (504-862-2452) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1895267	Utilities Engineering	N/a	n/a'	n/a	n/a
The report fails to identidy any relocation costs. Submitted By: Gregory DeBose (504-862-2452). Submitted On: 03-May-08					
1-0	Evaluation **Concurred** Relocation costs will be provided on the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Gregory DeBose (504-862-2452) Submitted On: 21-May-08				
	Current Comment Status: **Comment Closed**				

1896518	Operations	N/a	n/a'	n/a	n/a
Operations Division has completed review of the subject plans and specs and offers the following comment: Alternative 1 seems to be the best choice for this levee reach due to the best combination of cost, construction duration, and the ability to provide the required 100 year level of protection. For future O&M of this levee, has it been decided who will perform the maintenance? The Corps has been performing this duty in recent years, but I believe that the local sponsor will have to perform the maintenance after this contract is completed. Any use of borrow material from the Bonnet Carre Spillway must be coordinated with the on-site project manager, Mr. Chris Brantley, at (985) 764-7484. Submitted By: Steven Schinetsky ((504) 862-2343). Submitted On: 05-May-08					
1-0	Evaluation **Concurred** Alternative 1 appears to be favorable from an engineering perspective, but must be considered in the broader context of the work ongoing in other reaches before a final recommendation can be made. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** Concur with Alt. 1. No answer was provided as to who will provide the O&M for this levee.				

	Submitted By: Steven Schinetsky ((504) 862-2343) Submitted On: 21-May-08
1-2	Backcheck Recommendation **Close Comment** The WRDA 2007 bill clarified that the Algiers levees would remain under "federal responsibility" for operation and maintenance after completion of the hurricane upgrades. Therefore, the New Orleans District (Operations Division) will continue to perform the O&M duties on this levee reach and on all of the Algiers canal levees. Submitted By: David Lovett (504-862-2680) Submitted On: 21-May-08
1-3	Backcheck Recommendation **Close Comment** Concur. Submitted By: Steven Schinetsky ((504) 862-2343) Submitted On: 21-May-08
1-4	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Steven Schinetsky ((504) 862-2343) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1897362	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pg 1, Table 1-1	n/a

It states that both Alt.'s 4 and 5 each call for a floodwall along Engineers Road. Should Alt. 4 include a parallel road floodside of the floodwall as Alt. 5 does?

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Alternative 4, as described in the scope, does not have a parallel, internal road on the flood side of the floodwall. Alternative 5 does call for an internal roadway. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1897363	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pg 7, 4th and 5th Par	n/a

It states "In order to lay the geotextile fabric for Alternative 1...It is estimated that the soil mixing depth for Alternative 2...above the elevation +14-foot 100-year level." It is recommended to provide and reference a construction lift schedule that would ultimately maintain the elevation +14-foot 100-year level since it states that it will be constructed in lifts and that the settlement will occur relatively quickly.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Lift schedules will be provided for the Alternatives 1, 2, and 3 Levee Designs. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08

	Current Comment Status: **Comment Closed**

1897364	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pgs 7&8, Alt.'s 1&2 and Alt. 3	n/a

Where ramps currently exist but gates are not required, for Alt.'s 1&2, the ramps will have to be reconstructed to EL+15.5 but for Alt. 3, those same ramps will have to be rebuilt EL+16. The reason for this is not clear.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** The +15.5 should read +16.0. This will be corrected in the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897366	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pg 15, Sec 5.3-2057	n/a

Top of Structure and Levee should be changed from "El+14.5" to "El+14." Though it is just a typographical error, I do not want confusion to arise as to what the entire study was designed to.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** The elevation will be changed for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897367	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pgs 23-26, Tables 5-6 through 5-8	n/a

There are two different sets of factor of safety criteria being used in these tables, but that are taken from Table 5-2. It is my understanding that interim design criteria in Table 5-2 is presented to give the designer the option of using the higher MOP factors of safety or the lower set supplemented with the Limited Spencer Analyses, not using one set for a particular alternative and the other for another alternative as the designer sees fit.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Non-concurred** All of the safety factors used in the analyses came from SOW Table 2. Note 3 under the table indicated that the higher MOP safety factors could be used with no Spencer's method analysis for levees with no reinforcement. Note 4 under Table 2 indicated that Spencer's analyses were required for floodwalls and earthen levees utilizing geosynthetic reinforcement. The SOW did not indicate that the safety factors couldn't be mixed, and it is our interpretation of the Table 2 and its notes that the analyses were

	performed correctly and the safety factors applied correctly. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 05-Jun-08
	Current Comment Status: **Comment Closed**

1897368	Geotechnical	N/a	n/a'	Design Alt. Study Rpt, Pg 33, Sec. 8.2, 1st Sent	n/a

[**This item is flagged as a critical issue.**]

It states "One alternative has not been selected as of this 65% feasibility-level submittal." (This is also generalized on Pg ES-2, 2nd Par. and Pg 47, 1st Par.) If one alternative is not selected for this study, how many and which alternatives will be carried forward for the 95% EAR study? This should be made clear in both the Executive Summary and in the report.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Per the 65% review meeting, an alternative may appear to be preferred at this point, but has to be considered in the broader context of other ongoing reaches/projects to make a final recommendation. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Open Comment** Your evaluation did not fully address the comment. It is still not clear whether you will continue forward with all alternatives for the 95% submittal or a preferred alternative. Submitted By: Leeland Richard (504-862-2397) Submitted On: 06-Jun-08
2-0	Evaluation **Concurred** All seven alternatives will be presented in the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 12-Jun-08
	Backcheck not conducted
	Current Comment Status: **Comment Open**

1897369	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plate D-1	n/a

For stability analyses, it is more conservative to design the piezometric line at the top of the water instead of the way it is presented. This applies to other plates in App. D as well.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Non-concurred** Piezometric lines were determined according to DIVR 1110-1-400 procedures. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** For the reaches that were shown to have sand, I changed the piezometric line in the input files and compared them to the results that the A/E submitted in the report. The uplift forces were different but since the sand layers were stronger than clay layers above and below it, the minimum factors of safety changed very little if at all. Therefore, the comment is noted. Submitted By: Leeland Richard (504-862-2397) Submitted On: 10-Jun-08

	Current Comment Status: **Comment Closed**

1897370	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plate D-1	n/a

The note states "Piezometric surface determined assuming sand between El-20 and -35." For this reach, no sand is depicted from El-20 and -35. It may be applicable to other reaches, but consider removing it from this reach but check other reaches' plates as well.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Borings in all reaches indicated sand layers. In soil reaches 1, 2 and 4 the sand layers were relatively thin, occurred at isolated locations and as a result, soil layers were not included in the generalized soil conditions for these reaches. Relatively thick and relatively consistent sand layers were encountered in soil reaches 3 and 5, and the indicated sand layers were included in the generalized soil conditions for those reaches. The worst apparent sand layers indicated by the borings in all of the soil reaches were used to perform seepage analyses and determine the piezometric surfaces used in the stability analyses. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** For the reaches that were shown to have sand, I changed the piezometric line in the input files and compared them to the results that the A/E submitted in the report. The uplift forces were different but since the sand layers were stronger than clay layers above and below it, the minimum factors of safety changed very little if at all. Furthermore, the sections with all clay will be unaffected. Therefore, the comment is noted. Submitted By: Leeland Richard (504-862-2397) Submitted On: 10-Jun-08
	Current Comment Status: **Comment Closed**

1897371	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D-16 & D-17	n/a

The soil parameters and strata elevations at the five verticals do not appear to correspond to any of the soil parameters and strata elevations used for Reaches 1-5 on Plates D-1 through D-15. Therefore, explanation is needed as to where the information was taken from.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **For Information Only** For Information. The stability analysis is for Stage 4 (final stage) of a staged construction case with PV drains. A c/p' ratio of 0.22 was utilized to estimate strength gain due to consolidation of previous stages in accordance with USACE October 2007 guidelines. In addition, there is a 14 feet wide zone under new crest that has no wick drains, and thus very little strength gain between stages. This "unwicked" zone is in accordance with Design and Construction of Levees Manual where wick drains are used and an interrupted zone is required for the drainage blanket. MOP was not the ideal program to model this unwicked zone because more verticals are needed (more than 5) so shear strengths were used that to approximate conditions in the unwicked zone. Submitted By: Roy Thomas (504-837-6326) Submitted On: 22-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 06-Jun-08
	Current Comment Status: **Comment Closed**

1897372	Geotechnical	N/a	n/a'	App. D, Vol. 1,	n/a

				Plates D-16 & D-17	

[**This item is flagged as a critical issue.**]

These plates show the design having three layers of high strength geotextile. However, in the Design Alt. Study Report, Pg 23, the sequence of construction only calls for two geotextile layers. It is worth noting that when multiple layers of geotextile are used (in this case three), the layers of geotextile above the lower layer should be reduced with respect to capacity, but it is not clear whether or not this has taken place for the geotextile calculations. It is also worth noting that the T-allowable to meet the factors of safety can probably be met with a single layer of high strength geotextile. Also, with the three layers shown, there doesn't appear to be proper cover near the proposed protected side toe.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **For Information Only** For information. The required allowable tensile strength was 48,000 lb/ft, this requires a total ultimate tensile strength of 90,000 lb/ft. This may be achieved in 2 or 3 layers, as the highest strength GT's have been around 50,000 lb/ft ultimate strength. This can be more closely evaluated in the next phase of design. Three feet of cover is required over all GT's and this will be reflected in next submittal. The GT's tensile strength was assumed to be the same for all layers of GT. The adjustment of 2/3 load taken by bottom layer and 1/3 by upper layer can be made. Anchorage lengths may require longer GT's and small stability berms. Alternatively, use 3 layers GT and a 50%, 30%, 20% reduction. This would be good discussion point. Submitted By: Roy Thomas (504-837-6326) Submitted On: 22-May-08
1-1	Backcheck Recommendation **Open Comment** If you will change the reductions, please provide the calculations as we discussed to back them up for review purposes. Please also ensure that whatever strength is provided on the plates that the note "AT 5% STRAIN" follows or is included. Submitted By: Leeland Richard (504-862-2397) Submitted On: 06-Jun-08
2-0	Evaluation **Concurred** Revised calculations have been performed. Submitted By: Roy Thomas (504-837-6326) Submitted On: 12-Jun-08
	Backcheck not conducted
	Current Comment Status: **Comment Open**

1897375	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plate D-19	n/a

The top of the water is labeled as "EL. 15.5," whereas, the levee is labeled as "EL. 16.0." If this is not a typographical error, explanation needs to be provided explaining the difference.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** The elevation 15.5 will be changed to 16.0. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897376	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D-22	n/a

				through D-24	
For both protected side and flood side, the benches shown at elevations +6 and +5.5, respectively, would cause water to pond because they are horizontal. This should be addressed Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08					
1-0	Evaluation **Concurred** A slope will be shown on the berm to provide positive drainage. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08				
	Current Comment Status: **Comment Closed**				
1897377	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D27 and D-34	n/a
The Reduction Factor (RF) should be applied to the strengths instead of the resisting forces. The results may or may not change. Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08					
1-0	Evaluation **Concurred** Concur. Reduction factors will be applied to strengths, and all T-wall and gate analyses will be re-performed. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08				
	Current Comment Status: **Comment Closed**				
1897378	Geotechnical	N/a	n/a'	App. D	n/a
Input files for the MOP stability should be included in the appendix. Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08					
1-0	Evaluation **Concurred** Input files for representative MOP stability analyses will be included in the ITR packages that will be submitted later. These input files can be included in the main report appendix if desired by the Corps. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 28-May-08				
	Current Comment Status: **Comment Closed**				
1897379	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D-35 and D-36	n/a

Because you designed Alt. 1 (i.e. geotextile) with the lower set of factors of safety from Table 5-2 in the Design Alt. Study Report, you need to complete and include the Limited Spencer Analyses Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08	
1-0	Evaluation **Concurred** Alternative 1 geotextile design was analyzed using MOP (Figures D-16, 17 and 18) and Spencer's method (Figures D-35 and D-36). Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1897380	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D-90 and D-91	n/a

It is not clear if lateral spread, shrinkage, or natural subsidence is accounted for in the settlement calculations. In fact, unless I am mistaking, no settlement calculations and values used (e.g. coefficient of consolidation, etc.) are provided. Also, again, a lift construction schedule should be included. Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08	
1-0	Evaluation **Concurred** Concur. More detail will be reported on settlement analysis procedures, input parameters and results. We will address lateral spread, shrinkage and natural subsidence and provide lift schedules for the various levee alternatives. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897381	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plates D-92 through D-103 and the CPT data sheets	n/a

The value of Nc that is used to correlate the CPTs to the boring triaxial/UCT data should be provided. Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08	
1-0	Evaluation **Concurred** Concur. The Nc value used to correlate the CPT data to the boring trixial/UCT data will be indicated on the strength line plots. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08

	Current Comment Status: **Comment Closed**

1897382	Geotechnical	N/a	n/a'	App. D, Vol. 1, Plate D-106	n/a

It is not clear which is the actual composite section since there are two dark lines being shown.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Concur. The composite sections selected for evaluation from the topographic data will be more clearly defined. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897383	Geotechnical	N/a	n/a'	App. D	n/a

No geologic profile indicating the borings used, the geologic environments present, or the how the reaches were derived is provided. This should be included.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Concur. The geologic profile previously prepared for the Algiers Canal seepage study will be included in the report. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897384	Geotechnical	N/a	n/a'	Plans, Dwg C-01, Alt. 1 – Typ. Section Detail	n/a

It states the overbuild will be to El+15.5, but the Design Alt. Study Report and the Appendix D describe it being built to El+16. The same is true for Alt. 2 on Dwg C-02 and for Dwgs C-08 – C-17

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Concur. The levee options were evaluated with an overbuild to elevation +16. The plans will be changed accordingly. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1897385	Geotechnical	N/a	n/a'	Plans, Dwg C-03, Alt. 3 – Typ. Section Detail	n/a

The proposed earthen levee section shown here does not match what was designed in App. D, Plate D-22.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 05-May-08

1-0	Evaluation **Concurred** Concur. Will change the typical levee detail to match analysis sections. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 27-May-08
	Current Comment Status: **Comment Closed**

1898126	Construction Management	N/a	n/a'	n/a	n/a

Alternative # 2. The number of contractors that perform soil mixing are limited, and the costs are high compared to the geotextile alternative # 1. Recommend alternative # 1 due to the lower costs and the same ROW limits needed for this alternative versus the soil mix alternative # 2.

Submitted By: Donald Davis (504-862-2861). Submitted On: 06-May-08

1-0	Evaluation **Concurred** Concur that Alternative 1 is preferable to Alternative 2 when costs and ROW limits are considered. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Donald Davis (504-862-2861) Submitted On: 23-May-08
	Current Comment Status: **Comment Closed**

1903465	Real Estate	N/a	n/a'	All ROW Drawings	n/a

The following terminology should be used for different easements: -Existing Right-of-Way -Req'd Road ROW -Perpetual Flood Protection Easement -Temporary Work Area Easement -Perpetual Underground Piling Easement The work area easements and underground pile easements should be separated

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903467	Real Estate	N/a	n/a'	ROW Drawings	n/a
It is not clear why Alts 1 and 2 have the same footprint. It would be thought that the soil mix levee would have a smaller footprint Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **For Information Only** Levee layouts were attempting to minimize impacts to businesses on the protected side and still provide some floodside work space. The layouts will be re-visited for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 22-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1903482	Real Estate	N/a	n/a'	ROW Drawings G-02	n/a
-Verify that the benchmark shown are valid USACE benchmarks -Delete references to NGVD, should be NAVD88 2004.65 Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **Concurred** URS will verify benchmarks with surveyor and delete references to NGVD. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1903487	Real Estate	N/a	n/a'	ROW Drawings R-01	n/a
- Show limit of work (begin sta.) -show access corridor to Engineers Rd -Verify that a 60' wide corridor is needed Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08 Revised 09-May-08.					
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1903547	General	N/a	n/a'	ES-1	Last Paragraph
-The range in costs (72 to 450) does not match Table ED. -It should be noted that the durations presented in this paragraph					

and Table E2 are excessive. The A-E should consider multiple contracts and crews to complete the work. Do the durations only represent the construction? Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08	
1-0	Evaluation **Concurred** The text will be updated to reflect the table. Concur that constuction durations need to be reviewed for use of multiple crews/contracts. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903549	General	N/a	n/a'	ES-2	Last Paragraph

A discussion of the impacts to businesses as it relates to Alt 1 should be discussed. How many businesses must be relocated by this alternative. Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08	
1-0	Evaluation **Concurred** This discussion will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903561	General	N/a	Section 2.1	3	n/a

Include the following in this section: The purpose of this report is to present the results of an analysis of HSDRRS alternatives and to recommend the most feasible alternative based on engineering investigation. Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08	
1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903571	Project Management	N/a	Sheet C-03-001	n/a	n/a

On sheet C-03-001, the top elevation is shown as 5.33. Is the top of the gate at elevation 15.33, or does this number mean that the top of the gate raised by that much over the elevation of 14.0 ft?

Submitted By: William Delmar (225-274-4367). Submitted On: 09-May-08

Revised 09-May-08.

1-0	Evaluation **Concurred** The 5.33 should read 15.33. This will be corrected for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** closed without comment Submitted By: William Delmar (225-274-4367) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1903625	General	N/a	Section 4.1	7	n/a

It should be noted that only a 1000' section can be degraded at one time

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** This has been noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903643	Project Management	N/a	n/a'	n/a	n/a

On the Civil, Right of Way, and Structural drawings, the alternatives are named using numbers. Within the report, the alternatives are designated with letters. Which drawings match up to the alternatives shown in the report?

Submitted By: William Delmar (225-274-4367). Submitted On: 09-May-08

1-0	Evaluation **Non-concurred** During the 65% review meeting, it was found that a different report may have been given to some reviewers with the correct drawings. In URS' report, all alternatives are referred to with numbers. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Please provide correct version of 65% EAR for our files. We will provide any necessary comments on the 95% EAR review. Submitted By: William Delmar (225-274-4367) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1903648	Project Management	N/a	Section 11.8	73	n/a

An additional alternative was mentioned. Is this a recommended alternative? If so, will it be analyzed in later versions of this document or in a new document?

Submitted By: William Delmar (225-274-4367). Submitted On: 09-May-08	
1-0	Evaluation **Non-concurred** During the 65% review meeting, it was found that a different report may have been given to some reviewers with the correct drawings. In URS' report, there is not a Section 11.8 or page 73. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Please provide correct version of 65% EAR for our files. We will provide any necessary comments on the 95% EAR review. Submitted By: William Delmar (225-274-4367) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1903667	General	N/a	Section 5.1.2.4	12	n/a
Steel is listed as A36 with a yield of 50 ksi. Please correct Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **Concurred** Correction will be made and submitted in the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				

1903680	General	N/a	Section 5.2.2	14	n/a
Add the following write-up to this section: Surveys conform to the requirements stated in Section 9 of the latest version of the "Hurricane and Storm Damage Risk Reduction System Design Guidelines". This includes identifying a minimum of three (3) permanent benchmarks (new or existing) on design and construction drawings for all flood control projects (see plate or drawing XXX). The benchmarks were established relative to existing NAVD88 control established by the NGS, using either conventional differential leveling and/or the latest NGS-approved differential GPS network observations, with appropriate corrections to the local hydraulic design surface. Prior to and during actual construction stake out, these primary reference marks shall be verified externally and internally and field records of these survey verifications shall be permanently archived. A complete reevaluation of the vertical datum shall be conducted at each scheduled periodic inspection. The survey report and ITR have been completed and are shown (add location). Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				

1903681	Project Management	N/a	Appendix J	n/a	n/a

Plates were not provided in Appendix J of the report. Submitted By: William Delmar (225-274-4367). Submitted On: 09-May-08	
1-0	Evaluation **Concurred** Per guidance of the USACE project manager, only 3 sets of ROW drawings were provided for the 65% submittal to reduce paper. ROW drawings were also submitted in a previous submittal in both hard copy and electronic form for review. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Please provide correct version of 65% EAR for our files. We will provide any necessary comments on the 95% EAR review. Submitted By: William Delmar (225-274-4367) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1903685	Project Management	N/a	Section 1.1	1	n/a

In reference to the section where it states that final elevations have not been determined, when will the elevations be provided for the authorized 1% level of protection? Submitted By: William Delmar (225-274-4367). Submitted On: 09-May-08	
1-0	Evaluation **Non-concurred** During the 65% review meeting, it was found that a different report may have been given to some reviewers with the correct drawings. In URS' report, there is no Section 1.1. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Please provide correct version of 65% EAR for our files. We will provide any necessary comments on the 95% EAR review. Submitted By: William Delmar (225-274-4367) Submitted On: 28-May-08
	Current Comment Status: **Comment Closed**

1903689	General	N/a	Section 5.3	15	n/a

Add the following: Modeling and the design elevations The source of the hydraulic elevations in this EAR is the USACE MVN, October 9, 2007 report: Elevations for Design of Hurricane Protection Levees and Structures, Lake Pontchartrain and Vicinity Hurricane Protection Project; West Bank and Vicinity Hurricane Protection Project, (and subsequent addenda). All elevations are in Feet NAVD88 2004.65. The Hurricane and Storm Damage Risk Reduction System (HSDRRS) includes features that provide protection from a hurricane event that would produce a 1% exceedence surge elevation and associated waves. Hydraulic modeling and analyses performed to calculate the surge elevation and wave characteristics are described in the October 9, 2007 report. After construction is complete, the HSDRRS will meet the hydraulic requirements for levee certification, as documented in draft Engineering Technical Letter (ETL), Engineering and Design, Certification of Levee Systems, for the National Flood Insurance Program (NFIP). The hydraulic elevations presented in this EAR should be considered initial elevations. Additional, more thorough engineering investigations may follow to determine final construction elevations. This EAR considers different configurations of levees and structures that may have different design elevations. The selected alternative may have effects on design elevations in adjacent contract reaches. To assure continuity of design methodology, consistency of designs across contract reaches, and provide close quality management, final design elevations utilized throughout the New Orleans area will be reviewed by the New Orleans District Engineering Division Chief of Hydraulics and Hydrologic Branch.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903694	General	N/a	Section 5.3	15	n/a

Also Add: Future analysis As noted in the October 9, 2007 report, in the future, subsidence and sea level rise will affect elevations required for levee certification, and an analysis was performed to project the effect of these parameters on future surge elevations and wave characteristics. The New Orleans District will perform regular reassessments of these and other hydrologic parameters to assure the effectiveness of the system in future years. The system will undergo a reassessment after major events, significant changes in design and analysis methodologies, or no less than once every 10 years. Gages The gage(s) _____ is located within the contract reach and will be used for determining the tidal datum local mean sea level (LMSL) prior to construction. Additional temporary gages may be required depending on vertical accuracy requirements. The gage(s) can also be used to monitor future hydrologic conditions in the area. The datum of the gage(s) has been established to comply with criteria contained in the Vertical Control Requirements for Engineering, Design, Construction, and Operation of Flood Control, Shore Protection, Hurricane Protection, and Navigation Projects (Engineering Division Policy Memo #2). The relationship between NAVD88 2004.65 and LMSL for the gage(s) will be reevaluated and reviewed by NOAA every 5 years (or more frequently if warranted based upon rate of subsidence) Also include the following paragraph: The "Vertical Datum Report" for the East of Algiers Polder contains specific information on the gage network and the relationship between LMSL and NAVD 88 2004.65 for the project area.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903699	General	N/a	Section 5.4	15	n/a

Somewhere in this section, add the following: A complete geotechnical analysis will be performed on the selected alternative during the preparation of P&S. This analysis will conform to the guidelines included in the latest version of the "Hurricane and Storm Damage and Risk Reduction System Design Guidelines". We do not expect this further design work to affect the selection of the preferred alternative.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903721	General	N/a	Section 5.4.1	23	n/a

The wait time between 8" lifts is not reasonable considering the 2011 schedule requirements. Recommended proceeding with construction without wait time. The other issue to consider is that this construction sequence would levee the levee below the authorized grade for a long period of time

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** Construction schedule will be revised to achieve desired elevations quicker, assuming multiple crews/contracts/etc. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903775	General	N/a	Section 5.5.2	29	n/a

Per latest QA audit, provide a short rationale as to why the computer programs were chosen

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** This discussion will be added. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903778	General	N/a	n/a'	30	n/a

Add a section summarizing the borrow requirements (in place CY) for each alternative

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903786	General	N/a	n/a'	30	n/a

Add the following section: ARMORING Armoring will be provided for critical areas of the Hurricane and Storm Damage Risk Reduction System (HSDRRS) features described in this report. The design criteria determining the overtopping rates and armoring methods are still under investigation. Therefore, a detailed description of the armoring for the features in this report is not available. This work will continue in parallel with other pre-award activities until complete. The Armoring Team is

tasked to provide research and planning for the use of armoring against erosion and scour on the protected side of selected critical portions of levees and floodwalls in the HSDRRS. These critical areas include: transition points (where levees and floodwalls transition into any hardened feature such as other levees, floodwalls, pump stations, etc.), utility pipeline crossings, floodwall protected side slopes, and earthen levees that are exposed to wave and surge overtopping during a 500-year surge elevation. The Armoring Team will be guiding the design PDT in this process by providing an Armoring Manual for design guidance and criteria. This manual will be the basis for decisions on what should be armored and how armoring should take place. The Armoring Team defines resiliency as the capacity of the levee/floodwall to resist, with out catastrophic failure, overtopping (wave and surge) caused by a storm which is greater than the design event. A Resilience Team has been formed to validate the Armoring Team's initial focus. MVN Engineering Division is leading the Resiliency effort to affirm the practicality and applicability of using the 500 year surge elevation for armoring. The armoring methods to be implemented in the final design are anticipated to provide erosion protection such that the structure will be resilient to the 500-year surge elevation, or more defined as the ability of the structure to provide protection during events greater that the design event without catastrophic failure.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903788	General	N/a	n/a'	30	n/a

Also Add: The following armoring methods are under consideration and the appropriate combination of methods will be applied throughout the earthen levee projects included in the HSDRRS: • ACB – Articulated Concrete Blocks • ACB/TRM – The physical conditions or hydraulic parameters are such that small modifications could allow a reduction to a TRM (Turf Reinforcement Mattress) • TRM • TRM/Grass – The physical conditions or hydraulic parameters are such that small modifications could allow a reduction to a surface with good grass cover only • Good grass cover The armoring required for floodwalls will be a hybrid of materials to accomplish the require level of armoring. For instance, the interim floodwall repairs curtailed the concrete splash pads midway down the levee slope. The Armoring Team suggests that these pads be extended down the entire slope of levee and be curtained at the toe in order to eliminate a transition in a critical part of the levee section. Transitions have been a significant part of the Armoring Team's effort to date. The transitions from structures to floodwalls to sheetpiles are being addressed with detailed design drawings and will be forwarded to the individual design PDTs to aid them in their site-specific designs. Pipeline crossings are being identified by the Relocations Section in MVN. The Armoring Team is reviewing their detail drawings and requirements to include armoring features. These drawings will need ITR and should be forwarded to those utility owners that are ultimately responsible for the work.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903851	General	N/a	n/a'	31	n/a

Add the following somehwere in this section: The levee alternatives have adequate clearance to provide a 15' vegetation free zone on both the protected and flood sides and will thus be in compliance with current guidance and policy. Levee designs will include tree removal, sloping, grading, placing fill, etc. necessary to achieve a maintainable 15-ft vegetation free

zone from the toe of the levee on both the flood and protected sides. All plans and specifications (P&S) for HSDRRS levee contracts will ensure standards are met with respect to maintenance corridors. Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08	
1-0	Evaluation **Concurred** The text will be added to the section. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1903853	General	N/a	n/a'	31	n/a
Break Table 6-1 into easements provided in previous comment Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				

1903871	General	N/a	Section 9	39	n/a
This section will include the printout of ITR comments, USACE's DQAP, and 65% and 95% review comments for the final submittal Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				

1904186	General	N/a	n/a'	n/a	n/a
No section is provided on O&M requirements and costs. Use the following as a basis for the costs: * $9000/mile levee/year * $700/gate/year Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08					

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904211	Cost Engineering	N/a	n/a'	n/a	n/a

The costs for the subsuquent lifts should be provided and included with each alternative. Each lift should be treated as a contract with Mob, C&G, embankment, and F&S.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** URS will provide the estimates as requested for 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904215	Cost Engineering	N/a	n/a'	n/a	n/a

Only include the contingency for the final cost estimate, not Engineering, PM, Construction Supervision, etc. Also, please adjust contingencies to 25% to be in line with other EARs and the SGS EAR conducted.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** The 30% contingencies are as per the scope of work. Contingencies will be switched to 25%and reported for 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904226	Cost Engineering	N/a	n/a'	n/a	n/a

The durations presented are not acceptable. The A-E should assume that the alternatives are constructed in multiple crews and/or contracts. Use the access points as a rationale for adding crews.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** URS will provide updated schedules with appropriate changes/assumptions for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08

1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904238	Civil	N/a	n/a'	G-02	n/a

3 valid benchmarks should be provided. They should be the same benchmarks included in the survey plan.

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904253	Civil	N/a	n/a'	C-01	n/a

1.) The geotextile reinforcement appears to be unusually high. Would it be prudent to lower and move slightly further to the P/S to avoid having to degrade the existing levee. From the plan views it appears we are already taking a significant number of businesses. 2.) Degrading down to El. -1.0 will cause the F/S area to constantly be underwater

Submitted By: David Lovett (504-862-2680). Submitted On: 09-May-08

1-0	Evaluation **Concurred** Note 1: We evaluated the case of not degrading levee and the existing levee needs to be degraded for anchorage length. Note 2: elevation -1.0 was meant to be edge of water - that is, levee/ramp would slope to meet existing ground. This shows a worst case of sloping to edge of water. This will be revised for 95% submittal for clarity. Submitted By: Roy Thomas (504-837-6326) Submitted On: 22-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904583	Civil	N/a	n/a'	C-01	n/a

Note changes in the naming convention for easements previously provided for ROW drawings

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** This has been noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08

	Current Comment Status: **Comment Closed**

1904589	Civil	N/a	Gate Section	C-04	n/a

Suggest replacing the crushed stone surfacing with asphalt. This may be more applicable to Alt 5 where there are less gates leading to the F/S access road.

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904591	Civil	N/a	n/a'	All Plan View Drawings	n/a

1.) Consider lightening the aerial as the linework is difficult to see 2.) Revise ROW callouts per previous comment on naming convention 3.) Show ramps in profiles

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

Revised 10-May-08.

1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904592	Civil	N/a	n/a'	C-9	n/a

Groundline is shown going up to 15.5 between the 50' and 68' gates. Suggest having a wall between the gates without varrying the fill. Maybe just a CADD mistake or is fill there for barge protection? This is consistent for all double gates.

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** None. We will investigate placing a wall between the gates in close proximity. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904593	Civil	N/a	n/a'	C-10	n/a
Suggest showing the limits of construction to Whitney Barataria PS using the attached fronting protection limits. (Attachment: WhitneyBarateria.pdf) Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08					
1-0	Evaluation **Concurred** None. URS will coordinate with the USACE to place the relevant information on the drawing. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1904594	Civil	N/a	n/a'	C-28	n/a
Is a profile planned for Alts 4, 5, and 7? Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08					
1-0	Evaluation **Concurred** A profile can be performed for Alternative 7. Alternatives 4 and 5 are the same floodwall alignments with a different number/locations of gates, shown in plan view - therefore, we felt profiles were not needed. Submitted By: Roy Thomas (504-837-6326) Submitted On: 20-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1904596	Civil	N/a	n/a'	C-37	n/a
Provide end station Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08					
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08				
	Current Comment Status: **Comment Closed**				
1904597	Civil	N/a	n/a'	C-38	n/a
Suggest providing legend for hatching of acces road and drainage ditch					

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **Concurred** None. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904598	Civil	N/a	n/a'	C-58	n/a

1.) Provide begin station 2.) Is a profile available for this alternative? 3.) Please draw the gates on this sheet. Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **Concurred** A profile can be added for this alternative. Concur with other notes. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904600	Structural	N/a	n/a'	S-01	n/a

1.) It is not clear why a 5' thick slab is needed for a 9' high monolith. From the emebedment of the piles, it does not appear that a fixed pile head is assummed. 2.) Why is the monolith for the gate so wide? 24' width would appear to be excessive especially considering there were no unbalanced loads Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation Potential Cost Impact **Check and Resolve** The 5-ft thick slab and 24-ft wide monolith will both be evaluated in more detail prior to the 95% submittal to determine if these dimensions can be reduced. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904613	Structural	N/a	n/a'	S-07	n/a

Please explain the reasoning for the large number of P/S piling when the remainder of the walls for this Alternative have 2 rows (The drainage monolith being an exception). Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation Potential Cost Impact **Check and Resolve** The widths of the slabs for the 50-ft wide and 68-ft wide roller gate monoliths was increased over what had been used for the 30-ft wide swing gate monoliths to accommodate the larger pilasters and piles

	were distributed evenly across the width of the monoliths. Adjustment to the location of the pilaster so that the widths of the monoliths can be decreased and the number of rows of piles will be reduced. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904618	Structural	N/a	n/a'	S-13	n/a

Bracing rods could be shown for the swing gate Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **Concurred** Bracing rods will be added for the 95% submittal. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904622	Structural	N/a	n/a'	S-14	n/a

The top girder for all gates looks small. Are gates analyzed for barge impact? Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **For Information Only** The gates for Alternatives 4 and 5 were not analyzed for barge impact per direction given in a meeting on on 2/28/08. Barge impact was applied to other gate designs. Information regarding which gates do and do not include barge impact will be included in the report for the 95% submittal. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904623	Structural	N/a	n/a'	S-14	n/a

For the swing gate shown, rod braces should be included. Additionally, has the dead weight of a large gate been examined at all? Probably want an additional rod bracing from an extended column. Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **For Information Only** Rod braces will shown on the gates for the 95% submittal. The dead weight of the gate was considered in the design but it is not necessary to have the additional rod bracing from an extended column. The gate sizes on this project are similar to those designed for Contract 1 on the East of Harvey project and none of the gates on that project had the extended column. However, when the project goes to the design phase consideration to an extended column should be given.

	Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904624	Structural	N/a	n/a'	S-15	n/a

Top of gate should only be El 10

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** The top of gate elevation will be revised for the 95% submittal. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904670	Structural	N/a	n/a'	Pile Capacity Curve in Structural Calcs For Alts 1-3	n/a

It appears that no pile capacity is included until below around El -35. There aren't any unbalanced loads for the gate per the report text.

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** A single pile capacity curve was used for all analyses. This was done because using the pile curve for the case of neglecting capacity above a given elevation would be conservative and because the soil data available for developing the pile capacity curve was very limited. Submitted By: Barry Fehl (504-837-6326) Submitted On: 21-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904684	Structural	N/a	n/a'	Pg 3 of 38	30' Swing Gate - Alts 1,2,3, and 6

Clarify what the 75mph wind load is for. Per page 5-14 of the HSDRS, ASCE 7 should be used to calculate wind force with the force not being lower than 50psf

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **For Information Only** The wind load was not used in the design and it will be removed from the calculations. It should be noted during the design the 75 mph load should be conisdered with respect to whether or not the gate can be closed.

	Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904685	Structural	N/a	n/a'	Pg 28 of 38	30' Swing Gate - Alts 1,2,3, and 6

1.) The allowable bending stress calculated would not applicable if overstresses are already being applied to the moment. Please revise. 2.) Verify moment from Impact. 100x30' /4=750

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

Revised 10-May-08.

1-0	Evaluation **Check and Resolve** Item 1 will be evaluated based on the comment and the revision will be made if it is confirmed that overstresses have already been applied to the moment. The moment from impact will be verified as request in item 2. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904687	Structural	N/a	n/a'	Page 29 of 38	30' Swing Gate - Alts 1,2,3, and 6

Allowable stress being taken should be in accordance with AISC....0.6 Fy with the 5/6 reduction....The 1.11 factor should be removed. Apply overstress to the loads.

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation Potential Cost Impact **Concurred** The 1.11 factor was applied because it was assumed that surge from a hurricane would be considered a short term loading and EM 1110-2-2705 permits overstress of gates for short term loadsings. However, it is recognized that the HSDRS Design Guidelines limit stress levels to 0.5F(y). Therefore, the calculations will be revised accordingly. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904691	Structural	N/a	n/a'	Page 28 of 38	30' Swing Gate - Alts 1,2,3, and 6

The moment calculation should be based off of girder span, not the clear span

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **Concurred** The calucluation shown on page 28 is used for a preliminary calculation to size the girders. Page 33 of the calculations verifies the adequacy of the girder based on the clear span dimension. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904696	Structural	N/a	n/a'	n/a	Base Slab Design - Alts 1,2,3, and 6

Reduce the 5' slab to a more reasonable number for a gate of this type. Suggest 3'-6". Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation Potential Cost Impact **Check and Resolve** The thickness of the slab will be further evaluated prior to the 95% submittal to determine if the thickness of the slab may be reduced. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904697	General	N/a	n/a'	n/a	n/a

At what time is the 95% EAR expected? It is expected at that time a recommendation will be made? -Ennis Johnson LADOTD Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	
1-0	Evaluation **Concurred** Per revised USACE schedule, the 95% is due on June 18, 2008. This report is a piece of an overall analysis to provide 100-year protection to the area. While a preferred alternative may become apparent, it has to be considered in the context of the overall strategy. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904698	General	N/a	n/a'	n/a	n/a

Was the Peters Road Extension project included in this report? Potential alignment problems among others problems for both projects are involved? If this alternative is selected? -Ennis Johnson LADOTD Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08	

1-0	Evaluation **Concurred** The Peters Road Extension project was accounted for in preparation of the floodwall options through coordination between URS and the USACE. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904699	General	N/a	n/a'	n/a	n/a

During development of P&S- keep all state & Fed. Hwys clean during construction. -Ennis Johnson LADOTD

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** This guidance has been noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904700	General	N/a	n/a'	n/a	n/a

Is this a separate study from the 50% Innovation Study for Sector gate south? Separate consultants- possible duplication? -Ennis Johnson LADOTD

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** URS is not aware of the other study mentioned. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904702	Structural	N/a	Drainage Monolith Design	n/a	n/a

Provide the rationale for using Es assumming cyclic loading. A lock would see a cyclic loading, not convinced a FW would.

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** A floodwall will not be subject to a cyclic loading. The calculations will be revised to remove the reduction of the E(s) prior to the 95% submittal. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08

1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1904703	Structural	N/a	n/a'	S-14	n/a

Recommend reducing the number of girder on the Alt 4 and 5 gates to 3 and place hinges at each girder for the swing gate

Submitted By: David Lovett (504-862-2680). Submitted On: 10-May-08

1-0	Evaluation **Concurred** The revision will be made for the 95% submittal. Submitted By: Barry Fehl (504-837-6326) Submitted On: 20-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 22-May-08
	Current Comment Status: **Comment Closed**

1905908	Cost Engineering	N/a	n/a'	n/a	n/a

Recommend that all items with large quantities of materials be updated regularly to capture rapidly changing material, manufacturing and delivery costs.

Submitted By: DARRELL NORMAND (504-862-2727). Submitted On: 12-May-08

1-0	Evaluation **Concurred** All unit costs will be re-evaluated prior to 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: DARRELL NORMAND (504-862-2727) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1905943	Cost Engineering	N/a	n/a'	n/a	n/a

Recommend that for all alternatives with major items of work such as excavation, embankment/geotextile, and concrete T-wall, etc., the durations be calculated using multiple crews in order to reduce the construction durations. Note: Using multiple crews will increase the cost for mobilization/demobilization.

Submitted By: DARRELL NORMAND (504-862-2727). Submitted On: 12-May-08

1-0	Evaluation **Concurred** Revisions to schedules will be made assuming multiple crews/contracts for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: DARRELL NORMAND (504-862-2727) Submitted On: 21-May-08
	Current Comment Status: **Comment Closed**

1906157	Cost Engineering	N/a	n/a'	n/a	n/a
Recommend revising the construction schedule Gantt charts to reduce the start-up between concurrent construction operations for items such as steel sheet piling, steel H piling, and concrete T walls. Submitted By: DARRELL NORMAND (504-862-2727). Submitted On: 12-May-08					
1-0	Evaluation **Concurred** Revisions to schedules will be made per guidance for the 95% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 19-May-08				
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: DARRELL NORMAND (504-862-2727) Submitted On: 21-May-08				
	Current Comment Status: **Comment Closed**				

The comments and resolutions from the 95% submittal are provided below.

Comment Report: All Comments
Project: WBV-6a.2 Algiers Industrial Reach
Review: 95% EAR Review
Displaying 50 comments for the criteria specified in this report.
1734 ms to run this page

Id	Discipline	Section/Figure	Page Number	Line Number
1959948	Environmental	n/a'	n/a	n/a
Status of National Environmental Policy Act (NEPA) Compliance: The subject work will be covered in the individual environmental report (IER) #12entitled "Harvey and Algiers Canal Levee and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes", which is scheduled to be completed 03 July 2008. In addition, the comprehensive environmental document (CED) will have been prepared and include the subject work from IER #12. The subject work is not currently compliance with NEPA. Submitted By: Getrisc Coulson (504-862-1095). Submitted On: 17-Jun-08 Revised 30-Jun-08.				
1-0	Evaluation **Concurred** This information is noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Getrisc Coulson (504-862-1095) Submitted On: 29-Jul-08			
	Current Comment Status: **Comment Closed**			

1967200	Civil	Typical Sections for Full Levee, Alts 1 thru 3	Sheets C-01 thru C-03	n/a

The maximum and minimum distances from the existing levee centerline to the new levee centerline should be shown. This has to do with respect to levee stability into Algiers Canal with the water surface in Algiers Canal at elevation -1.0 and the levee crown at elevation 14.0.

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08

1-0	Evaluation **Concurred** These distances will be added for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1967222	Civil	Alternative 1 - Typical Section	C-01	n/a

1. There is no landside stability berm required when the groundline on the landside is below elevation 0.0? 2. What is the fabric strength and width. The fabric cannot extend to the levee slopes, it must have a minimum amount of coverage so it does not get damaged by grass mowers. 3. Label "Compacted Fill" on the section. 4. A typical section must be included for the transition between the full levee and the T-Wall for the gate monolith. 5. Remove the note or show the typical section at it's farthest distance from the existing levee centerline. The note should pertain to the new levee right-of-way, not the existing levee right-of-way. Take the * off line for the "Existing ROW" and put it on the line for the "Perpetual Flood Protection Easement". Add "New" before "Perpetual".

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08

1-0	Evaluation **Concurred** 1. The need for a stability berm on protected side will be re-evaluated in 100% submittal. Reverse section stability analyses will be run. 2. For information - fabric strengths are: Highest GT Layer: Tall = 10,000 lb/ft, Tult = 19,000 lb/ft -- Middle GT Layer: Tall = 14,000 lb/ft, Tult = 26,000 lb/ft -- Lowest GT Layer: Tall = 24,000 lb/ft, Tult = 45,000 lb/ft. Concur that a minimum of 3 feet of cover is required over GT's. 3. Concur, this will be edited for 100% submittal. 4. Concur, this will be added for 100% submittal. 5. Concur, this will be edited for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 09-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur. Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1967248	Civil	Alternative 2 - Typical Section	C-02	n/a

1. Either show the top elevation of the Deep Mixing Columns or provide the length of the columns. There's no way to cost out this alternative without knowing one or the other. 2. Show the distance between the individual columns and the distance between the rows perpendicular to the levee centerline, i.e., 7 feet apart, etc. 3. Delete the * next to "Existing ROW" and put it next to "Perpetual...". Add "New" in front of "Perpetual". 4. Add in a Typical Section for the transition between the full levee and the T-wall at the floodgates. 5. Why are deep mixing columns needed for the gate monoliths?

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08	
1-0	Evaluation **Concurred** 1. Concur. DSM columns will extend from average el.-1.5 to el-25. This zone will be indicated on Sheet C-02. 2. Concur. DSM column design based on 32" diameter columns at 24" c/c grid. This info will be indicated on Sheet C-02. 3. Concur. We will edit for 100% submittal. 4. Concur. A new section will be developed. 5. DSM columns should not be needed for the gate monoliths. Submitted By: Roy Thomas (504-837-6326) Submitted On: 16-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1967261	Civil	Alternative 3 - Typical Section	Sheet C-03	n/a

1. Delete the note. 2. Why is the 1V on 4H landside slope needed instead of the 1V on 3H slope? 3. Add in a typical section for the full levee at the transition with the T-Wall for the floodgate. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08	
1-0	Evaluation **Concurred** 1. Concur. This note will be deleted. 2. The 1v on 4h slope is needed for stability. 3. Concur. A new section will be added for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1967304	Civil	n/a'	Sheets C-04 and C-05	n/a

1. What elevation is the existing levee being maintained at for this alternative? 2. Alternative 4. What type of gate is this? Alternative 5 shows a Roller Gate. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08	
1-0	Evaluation **Concurred** 1. For Alternatives 4 and 5, the existing levee is not affected. It is assumed that the current levee lift to 10.0 will be maintained. 2. The typical section for Alternative 4 shows a roller gate (worst case for right-of-way). Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1967306	Civil	Alternative 6 - Typical Section	Sheet C-06	n/a

1. Is the T-wall designed for drag down when the levee embankment settles? 2. A recent stability analysis performed for the reach between Algiers Lock and Hwy 23 (WBV-47.1) with the earthen levee at 10.0 showed that 30' of additional right-of-

way is required. Why is this reach any different? Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08	
1-0	Evaluation **Concurred** 1. Downdrag calculations for this alternative will be submitted to the USACE for review and addressed in the 100% EAR. 2. This may be due to the structural (floodwall) nature of this options versus an earthen section to the north. Submitted By: Roy Thomas (504-837-6326) Submitted On: 31-Jul-08
	Backcheck not conducted
	Current Comment Status: **Comment Open**

1967309	Civil	n/a'	Sheet C-07	n/a
The sill elevation of 3.0 is too low for high tides, not generated by tropical systems. The minimum elevation should be 4.0 which is being used for C&C Marine's 68' roller gate. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08				
1-0	Evaluation **Concurred** Per concurrence with this comment and comment 1978283, drawings will be modified to show sill elevation of 4.0 - no new design calculations will be performed at this stage. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08			
	Current Comment Status: **Comment Closed**			

1967312	Civil	n/a'	Plan and Profile Sheets, C-8 thru C-27	n/a
The Algiers Canal levee baseline should be shown on the plan views with PI Stations and azimuths between PI's. URS has this from the P&S they prepared for WBV-6a.1. Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08				
1-0	Evaluation **Concurred** These will be added for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08			
	Current Comment Status: **Comment Closed**			

1967321	Civil	n/a'	Page 27 of the Design Criteria Summary	n/a
The summary for the reinforced section, Alternative 1, refers to using PV drains, placing 3 layers of geotextile and waiting for 6 months between lifts for the clay to gain strength. This is uncalled for. There is no need to wait for the clay to gain strength between lifts. The drawing for Alternative 1 makes no reference to using 3 layers of geotextile or wick drains, etc.				

Submitted By: Ellsworth Pilie ((504) 862-2768). Submitted On: 21-Jun-08	
1-0	Evaluation **Concurred** Concur that drawing needs to be corrected. Waiting periods are between stages of fill (about 4 ft in height) for strength gain of clays, not lift thicknesses of fill (8 inches or so). Submitted By: Roy Thomas (504-837-6326) Submitted On: 09-Jul-08
1-1	Backcheck Recommendation **Close Comment** Concur Submitted By: Ellsworth Pilie ((504) 862-2768) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1968472	Hydraulics	n/a'	n/a	n/a
For information purposes only: The minimum required hydraulic elevation without structural superiority is 13 ft. Submitted By: Keely Crowder (504-862-2114). Submitted On: 23-Jun-08				
1-0	Evaluation **Concurred** This information is noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Keely Crowder (504-862-2114) Submitted On: 23-Jul-08			
	Current Comment Status: **Comment Closed**			

1970048	Hydraulics	n/a'	n/a	n/a
For information only: If an alternative is selected that differs from the hydraulic preliminary desgn (October 9, 2007 hydraulic design report) H&H should review the structure/levee elevations and slopes before designs are incorporated into P&S. examples: Floodwalls situated on top of levees are not included in the hydraulic preliminary designs and should be reviewed by H&H. Floodwalls situated behind levees are not included in the hydraulic preliminary designs and should be reviewed by H&H - this case may provide for a lower floodwall elevation. Levees requiring stability berms larger than the min hydraulic design should be reviewed by H&H - this case may provide for a lower levee elevation. Submitted By: Keely Crowder (504-862-2114). Submitted On: 24-Jun-08				
1-0	Evaluation **Concurred** This information has been noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Keely Crowder (504-862-2114) Submitted On: 23-Jul-08			
	Current Comment Status: **Comment Closed**			

1970070	Hydraulics	n/a'	17	n/a
The Phase 2 1% Design- 2007 (90% confidence) still water elevation is 9.0 NAVD 88. In the report it is listed as the Phase 1 Still Water. This is not correct. It should be listed as the 2007 still water elevation.				

Submitted By: Keely Crowder (504-862-2114). Submitted On: 24-Jun-08	
1-0	Evaluation **Concurred** This will be corrected in the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Keely Crowder (504-862-2114) Submitted On: 23-Jul-08
	Current Comment Status: **Comment Closed**

1974129	Utilities Engineering	n/a'	n/a	n/a

Relocation Team identified several major facilities not shown on the drawings by the AE during the 65% review for this scope of work. The 95% review still fails to indentify these facilities on the drawings. Submitted By: Gregory DeBose (504-862-2452). Submitted On: 26-Jun-08	
1-0	Evaluation **Concurred** URS will add the utilities described in the 65% review on the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 14-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Gregory DeBose (504-862-2452) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1974146	Utilities Engineering	Report	n/a	n/a

Cost data provided in the report on pages 38 and 40 do not provide the source of these estimates. Submitted By: Gregory DeBose (504-862-2452). Submitted On: 26-Jun-08	
1-0	Evaluation **Concurred** The sources of the cost data will be provided in the 100% submittal. Sources include previous studies in the area and price quotations from Get-a-quote website. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Gregory DeBose (504-862-2452) Submitted On: 24-Jul-08
	Current Comment Status: **Comment Closed**

1978275	General	n/a'	ES-3	n/a

The impacts to the local business must be stressed in this write-up. Upon closer examination, even if a building is not taken with the levee expansion, the yards of the businesses will be affected. These encroachments on the businnesses could affect their operations and be highly opposed. Alternative 6, despite the high cost, appears to be the only alternative that would not adversly affect the businesses along the canal. Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08	
1-0	Evaluation **Concurred** More discussion will be added to these impacts for the 100% submittal.

	Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1978277	General	n/a'	1	n/a

The statement that "The canal connects the Hero Canal to the Miss. River via a navigation lock" doesn't appear necessary. Not much traffic on the Hero Canal Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08	
1-0	Evaluation **Concurred** This statement will be deleted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1978279	General	n/a'	5	Para 2.2

Revise the 30% contingency to 25% Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08	
1-0	Evaluation **Concurred** This will be updated for the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1978281	General	n/a'	11	Alt 7

Revise Alt 7 to only include gates at the 16 locations detailed in the SOW. Future P&S for this alternative may involve additional gates to the 16, but those will be evaluated on a case by case basis, not all ramps should receive a gate Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08	
1-0	Evaluation **Concurred** The report, plans, costs, and schedules will be updated to reflect the reduction in gates to 16. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08

	Current Comment Status: **Comment Closed**			
1978282	General	n/a'	13	Para 5.1.2
Verify that unit weights agree with HSDRS...Structural portion of HSDRD recommends 64 pcf for water Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** We will verify that unit weights agree with HSDRS. Please note that we were instructed by USACE to use 62.4 pcf for the unit weight of water for this project. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Keep 62.4 pcf as instructed to do so by Geotechnical personnel Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978283	General	n/a'	15	Para 5.1.3 - Alt 7
Suggest raising sill to El 4.0 per ED-L recommendations. No design change necessary Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** Drawings will be modified to reflect the sill elevation at 4.0. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978285	General	n/a'	34	Para 5.5.3
State FS used here Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** FS will be provided. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978286	General	n/a'	43	Section 9
ITR comment printout (all comments closed out) with signed certification should be sumitted in final package				

Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08	
1-0	Evaluation **Concurred** Noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1978324	General	n/a'	Quantities	n/a
The embankment quantities are not presented in the quantity and cost estimate appendix Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				

1-0	Evaluation **Concurred** This information will be provided in the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1978325	General	n/a'	Schedules	n/a
Verify that gate fabrication is not a critical path item in the scheduling Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				

1-0	Evaluation **Concurred** Schedules will be revised to insure fabrication is not a critical path. Submitted By: Roy Thomas (504-837-6326) Submitted On: 11-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 14-Jul-08
	Current Comment Status: **Comment Closed**

1978326	General	n/a'	Schedules - Alt 7	n/a
Update scheduling for 16 gate locations Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				

1-0	Evaluation **Concurred** Noted, the schedule will be updated. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment.

	Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978366	General	n/a'	C-02	n/a
Gate Monolith should be designed without soil mixing. Interference issues with columns and piling could be problematic Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** Drawing will be updated to reflect. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978367	General	n/a'	S-09	n/a
1.) Thickness of the slab must be provided 2.) Only a 6" center to center spacing is shown between the sheet piling and h-piling. This is not possible Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** 1. Concur, this will be provided. 2. Concur, drawings will be revised with correct information. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978368	General	n/a'	S-17	n/a
TRS costs should be included in the cost estimates Submitted By: David Lovett (504-862-2680). Submitted On: 29-Jun-08				
1-0	Evaluation **Concurred** These will be added for the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08			
	Current Comment Status: **Comment Closed**			
1978840	Operations	n/a'	n/a	n/a
Operations Division has completed review of the subject plana and specs and offers the following comments: 1) - Continuous access must be provided along both sides of the levee/floodwall both during construction and after completion for the purposes of inspection and maintenance. 2) - No vegetation is allowed within 15 feet of the levee toe. 3) - The Corps'				

Operations Division will be the responsible party for O&M of the completed project. 4) - Any borrow material taken from the Bonnet Carre Spillway must be coordinated with the on-site spillway manager, Mr. Chris Brantley, at (985) 764-7484. Submitted By: Steven Schinetsky ((504) 862-2343). Submitted On: 30-Jun-08	
1-0	Evaluation **Concurred** This information is noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Steven Schinetsky ((504) 862-2343) Submitted On: 21-Jul-08
	Current Comment Status: **Comment Closed**

1979042	Real Estate	n/a'	n/a	n/a

All proposed alignments will greatly impact the local businesses along Algiers Canal during construction. Alignment #3 will likely cause all the businesses to relocate or cease to exist. While it will leave them outside the protection, Alignment #5 would have the least 'long-term' impacts on the local businesses. Submitted By: Louis Cheek (504-862-1563). Submitted On: 30-Jun-08	
1-0	Evaluation **Concurred** URS concurs with this assessment. Per this and other comments, URS will add a more detailed discussion of impacts to businesses along this reach due to the alternatives. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Louis Cheek (504-862-1563) Submitted On: 08-Jul-08
	Current Comment Status: **Comment Closed**

1981239	Construction Management	n/a'	n/a	n/a

Appendix A, Cost and Quantity Estimates. Assure that cost estimates reflect recent increases in fuel prices. Submitted By: Donald Davis (504-862-2861). Submitted On: 01-Jul-08	
1-0	Evaluation **Concurred** The unit costs will be reviewed prior to 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Donald Davis (504-862-2861) Submitted On: 09-Jul-08
	Current Comment Status: **Comment Closed**

1981240	Construction Management	n/a'	n/a	n/a

Appendix B, Construction Schedules. For Alternatives 1, 2 and 3, notes in 'Assumptions' state that entire levee is divided into 5 contracts, with the preliminary construction schedule shown representing 1 contract. The embankment quantities in

the schedule do not reflect 1/5 of the total embankment quantities indicated in the preliminary cost estimates in Appendix A. Submitted By: Donald Davis (504-862-2861). Submitted On: 01-Jul-08	
1-0	Evaluation **For Information Only** Embankment quantities include levee embankment as well as fill for the ramp embankments, which is a separate line item in Appendix A. For example, Alternatives 1 and 2 have 845,000 CY for levee and 120,168 CY for ramps. The total is 965,168 CY for the 5 contracts, which is approximately 193,000 CY. We rounded this number up to 200,000 CY in Appendix B for scheduling purposes. Submitted By: Roy Thomas (504-837-6326) Submitted On: 14-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Donald Davis (504-862-2861) Submitted On: 17-Jul-08
	Current Comment Status: **Comment Closed**

1981241	Construction Management	n/a'	n/a	n/a
Dwg. C-02. Alternate 2 – Gate Monolith. Soil mixing should not be needed for gate monolith. Submitted By: Donald Davis (504-862-2861). Submitted On: 01-Jul-08				
1-0	Evaluation **Concurred** This will be modified for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Donald Davis (504-862-2861) Submitted On: 09-Jul-08			
	Current Comment Status: **Comment Closed**			

1981248	Construction Management	n/a'	n/a	n/a
Dwgs. General. Assure that all property/facility/utility owners and their points of contact are up-to-date for final plans and specs. Coordination with these owners is critical to avoid delays during construction. Submitted By: Donald Davis (504-862-2861). Submitted On: 01-Jul-08				
1-0	Evaluation **Concurred** This information is current per the P&S that URS submitted late last year. URS is currently performing EDC work for the current levee lift, and will update point-of-contact information as we become aware of new owners/lessees. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Donald Davis (504-862-2861) Submitted On: 09-Jul-08			
	Current Comment Status: **Comment Closed**			

1981491	Cost Engineering	Design Alternative Study Report 95%	ES-3	n/a

		Submittal June 2008		
"Design Alternative Study Report 95% Submittal June 2008" page ES-3, before selecting an alternative ; real estate acquisition, demolition cost and schedules should be considered. Submitted By: Bill Rester (504-862-2956). Submitted On: 01-Jul-08				
1-0	Evaluation **Concurred** This information is noted - a more detailed discussion of impacts to businesses will be added to the report. Demolition costs and schedules will also be noted. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Bill Rester (504-862-2956) Submitted On: 17-Jul-08			
	Current Comment Status: **Comment Closed**			
1981502	Cost Engineering	"Appendix A – Cost estimates and Quantities 95% Submittal June 2008"	3	n/a
"Appendix A – Cost estimates and Quantities 95% Submittal June 2008" page 3, the cost of large quantity items such as fill/embankment, steel and concrete cost should be updated before bid request. Submitted By: Bill Rester (504-862-2956). Submitted On: 01-Jul-08				
1-0	Evaluation **Concurred** Unit costs will be reviewed prior to 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Bill Rester (504-862-2956) Submitted On: 17-Jul-08			
	Current Comment Status: **Comment Closed**			
1981512	Project Management	n/a'	n/a	n/a
"General comment", drawings and specifications should be converted to directly to searchable pdfs. Current documents are scanned as images. Submitted By: Bill Rester (504-862-2956). Submitted On: 01-Jul-08				
1-0	Evaluation **For Information Only** URS will work with the documents and within the scope to insure that all submittals meet USACE requirements. Submitted By: Roy Thomas (504-837-6326) Submitted On: 11-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Bill Rester (504-862-2956) Submitted On: 17-Jul-08			
	Current Comment Status: **Comment Closed**			
1982392	Real Estate	n/a'	G-02	n/a

Notes 2 and 4 must be updated with the latest datum and benchmarks Submitted By: David Lovett (504-862-2680). Submitted On: 02-Jul-08	
1-0	Evaluation **Concurred** These will be updated for the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 11-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 14-Jul-08
	Current Comment Status: **Comment Closed**

1982400	Real Estate	n/a'	R-01	n/a

Are servitude points are to be filled in the table? Submitted By: David Lovett (504-862-2680). Submitted On: 02-Jul-08	
1-0	Evaluation **Concurred** They will be added for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 11-Jul-08
	Current Comment Status: **Comment Closed**

1983960	Geotechnical	n/a'	Design Alt Study Rpt, Write-up, Pg 8, 4th Par, 3rd Sent	n/a

It states "After initial construction to El+16,...above the elevation +14 100-year level." It does not appear that the lift schedules referenced in 65% Submittal Comment #1897363 have been addressed in this 95% submittal. This is necessary given that you stated two feet of settlement will occur in 3-6 months, which is relatively quick. Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08	
1-0	Evaluation **Concurred** The lift schedules will be clarified for the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 21-Jul-08
	Current Comment Status: **Comment Closed**

1983961	Geotechnical	n/a'	Design Alt Study Rpt, Write-up, Pgs 8&9	n/a

It doesn't appear that the 65% Submittal Comment #1897364 has been addressed in this 95% submittal.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08	
1-0	Evaluation **Concurred** We changed the elevaton in most of the discussion, but missed two places. This will be corrected in the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 09-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 21-Jul-08
	Current Comment Status: **Comment Closed**

1983962	Geotechnical	n/a'	Design Alt Study Rpt, Write-up, Pg 20, Par. C, 6th and 7th Sent	n/a
It states "It is noted that the magnitudes of settlement...should not be significant relative to the consolidation settlement that will occur." You need to further explain your statement about "properly compacted and staged properly." USACE usually specifies 90% compaction. Regardless of how it is staged, the lateral spread may still exist. Therefore, both should be accounted for and included in the design, no matter how insignificant it may seem. Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08				
1-0	Evaluation **Concurred** Based on our experience, settlement caused by the combined effects of lateral spread of the compressible in-place subgrade soils, shrinkage of the levee fill soils (if compacted to 90% of proctor density) and natural subsidence of the New Orleans area should not increase vertical movement (settlement) of the levee by more than 10% above the consolidation settlement indicated in the report. It is noted that the settlement amounts indicated in the report should be assumed to have an accuracy in the range of plus or minus 25 percent. Based on the accuracy of the consolidation settlement analyses and our recommendation in the report that settlement be monitored to provide assurance that the levee is above the design levels at all times, it is our opinion that lateral spread, shrinkage and natural subsidence will not be significant factors for this project. Submitted By: Roy Thomas (504-837-6326) Submitted On: 23-Jul-08			
	Backcheck not conducted			
	Current Comment Status: **Comment Open**			

1983963	Geotechnical	n/a'	Geot Calcs, App. D, Vol. 1, Plate D-19	n/a
The top of the water is shown at EL. 15.5 but the top of the levee is at EL. 16.0. Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08				
1-0	Evaluation **Concurred** The water elevation will be changed to +16 for the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08			
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 21-Jul-08			
	Current Comment Status: **Comment Closed**			

1983964	Geotechnical	n/a'	Geot Calcs, App. D,	n/a

			Vol. 1, Plates D-1 through D-42	

For the initial analyses for each reach, the slopes were 1V:5H floodside (F/S) and 1V:4H protected side (P/S). Then, once the critical was found, slopes of 1V:5H F/S and 1V:3H P/S were used for some alternatives, slopes of 1V:3H F/S and P/S for others, while slopes of 1V:3H F/S and 1V:5H P/S for others, and not really sure what the slopes are for Spencer. This needs to be cleared up or explained.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08

1-0	Evaluation **Concurred** Slopes of 1v:5h (F.S.) and 1v:4h (P.S.) were used in the original levee stability analyses to determine the most critical reach to be used in the analyses of the different design alternatives. In the analyses of the levee design alternatives and for the T-wall embedded in the levee for Alternative 6, slopes of 1v:5h (F.S.) and 1v:3h (P.S.) were used. The 1v:3h P.S. slope was used to limit real estate requirements. For the Alternative 6 case where the T-wall was located at the protected side toe of the existing levee, the existing levee, which has 1v:3h slopes on both sides was analyzed. The slopes will be shown on the Spencer's method figures in the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 22-Jul-08
	Current Comment Status: **Comment Closed**

1983965	Geotechnical	n/a'	Geot Calcs, App. D, Vol. 1, Plates D-16 through D-18	n/a

The explanation of the geonet PV drains and CB cutoff wall as shown on D-18 should be shown on D-16 and D-17 also

Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08

1-0	Evaluation **Concurred** Concur, this will be added for 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 09-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 21-Jul-08
	Current Comment Status: **Comment Closed**

1983967	Geotechnical	n/a'	Geot Calcs, App. D, Vol. 1	n/a

There are time settlement curves presented for Alt 2 (Fig D-90) and Alt 3 (Fig D-91). There should be a similar figure included for Alt 1.

Submitted By: Leeland Richard (504-862-2397). Submitted On: 02-Jul-08

1-0	Evaluation **Concurred** Concur, this will be shown on the 100% submittal. Submitted By: Roy Thomas (504-837-6326) Submitted On: 09-Jul-08
1-1	Backcheck Recommendation **Close Comment**

	Closed without comment. Submitted By: Leeland Richard (504-862-2397) Submitted On: 21-Jul-08
	Current Comment Status: **Comment Closed**

1984519	Cost Engineering	Appendix A&B	3	n/a

Algiers Appendix A&B, page 3 of pdf, unit cost of Fill/Embankment is given without location of borrow pit. Distance of borrow pit supply from the work site can effect the Preliminary Cost Estimate.Example ;"Haul distance from borrow pit assumed to be 25 miles." Submitted By: Bill Rester (504-862-2956). Submitted On: 03-Jul-08 Revised 03-Jul-08.	
1-0	Evaluation **Concurred** Unit cost for fill/embankment was discussed with USACE during course of project. We agreed to use $30/CY based on ongoing projects at the USACE. Representative distances to borrow pits could vary depending on job. URS will add a note stating how unit cost was determined. Submitted By: Roy Thomas (504-837-6326) Submitted On: 08-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Bill Rester (504-862-2956) Submitted On: 17-Jul-08
	Current Comment Status: **Comment Closed**

1987203	Cost Engineering	n/a'	n/a	n/a

My opinion only, the dwgs where good, hydrographs were included, all dwg sets should have a bill of materials for estimating, bidding, and a check on design; and I think a cantilever flood wall in the crown of the existing levee would be the quickest and cheapest solution Submitted By: Bill Rester (504-862-2956). Submitted On: 07-Jul-08	
1-0	Evaluation **Non-concurred** Bills of materials are not typically put on feasibility-level drawings. Although the cantilever wall may be the most cost effective, current guidance from the USACE does not allow I-walls in this situation. Submitted By: Roy Thomas (504-837-6326) Submitted On: 11-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Bill Rester (504-862-2956) Submitted On: 17-Jul-08
	Current Comment Status: **Comment Closed**

1988593	Structural	n/a'	n/a	n/a

Reference comments 1904685 and 1904687 from the 65% review. It appears comments pertaining to using overstess values in accordance with latest HSDRS have not been adressed in the 95% calculations. Submitted By: David Lovett (504-862-2680). Submitted On: 08-Jul-08	
1-0	Evaluation **Concurred** These comments will be addressed in the 100% submittal.

	Submitted By: Roy Thomas (504-837-6326) Submitted On: 11-Jul-08
1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: David Lovett (504-862-2680) Submitted On: 14-Jul-08
	Current Comment Status: **Comment Closed**

SECTION 10 – LOCAL SPONSOR INPUT

Comments from the Louisiana Department of Transportation and Development were received as part of the 65% review. No local sponsor comments were received from the 95% review. Those comments, as well as the responses and resolutions, are included in Section 9.

SECTION 11 – RECOMMENDATIONS

After consideration of each of the alternatives presented in this report, several of the alternatives were determined to be much less feasible due to high costs, long construction durations, utility and building relocations, or large amounts of required additional right-of-way. After evaluation of these criteria, Alternatives 1 and 7 are the most feasible options; however, both alternatives have their disadvantages. It should be noted that Alternative 1 will have soil settlement that will require maintenance lifts after construction, and Alternative 7 does not provide 2057 level of protection. For Alternative 7, it is assumed that the 2057 level of protection would have to be established south of this project reach.

Alternative 1 is the preferred alternative assuming 2057 protection is not implemented south of the project reach. It is the lowest cost option that provides 2057 flood protection. However, should the 2057 protection be provided south of the project reach, Alternative 7 becomes the preferred alternative. Alternative 7 has the least impact to the current property owners at a lower cost when compared to all alternatives except Alternative 1.

The evaluation of each alternative was done based on cost estimates, anticipated construction duration, relocations, and real estate requirements. Alternatives 1 and 2 are similar in regards to the footprint of the proposed levee, the minimal amount of additional right-of-way required, the number of gates, and the alignment. Both of these alternatives will also require levee setbacks at certain ramp locations to enable access of unloaded cranes to Algiers Canal. Because these alternatives are similar, Alternative 2 was determined to be less feasible of the two because it has a higher cost estimate and longer construction duration.

Alternative 3 was not recommended due to the volume of fill that would be needed, the long construction duration, the quantity of utility and structure relocations, and the large amount of additional right of way required. The levee would require approximately half of the existing properties along Algiers Canal, making the remaining portions of the properties undesirable.

While Alternatives 4, 5, and 6 provide easier access to Algiers Canal compared to the other alternatives, these options were not recommended due to the large cost estimate for construction of floodwalls. In addition, Alternatives 4 and 6 have gates located at each existing ramp, resulting in high O&M costs to open and close these gates. Alternatives 4 and 5 also have additional right-of-way requirements that would prompt building and utility relocations.

It should also be noted that all alternatives affect some or all of the existing facilities during construction. Alternative 7 has the least impact in regards to construction impacts and required real estate. Alternatives 1 through 5 will require some additional right-of-way and structures be taken. Alternative 6 has minimal impact to required right-of-way, but is much more costly to construct when compared to the other levee alternatives.